EDITORIAL STAFF

E. L. SHANER
Editor-in-Chief

E. C. KREUTZBERG
Editor

A. J. HAIN
Managing Editor

E. F. ROSS
Engineering Editor

D. S. CADOT
Art Editor

ASSOCIATE EDITORS

G. H. MANLOVE — J. D. KNOX
W. G. GUDE — G. W. BIRDSALL
W. J. CAMPBELL

New York
I. H. SUCH — B. K. PRICE
L. E. BROWNE

Pittsburgh
R. L. HARTFORD

Chicago
J. F. POWELL

Detroit
A. H. ALLEN

Washington
L. M. LAMM

London
VINCENT DELPORT

BUSINESS STAFF

G. O. HAYS
Business Manager

C. H. BAILEY
Advertising Service

New York . . E. W. KREUTZBERG, B. C. SNELL
Pittsburgh . . . S. H. JASPER
Chicago . . . L. C. PELOTT, W. F. O'DELL
Cleveland . . . R. C. JAENKE, C. N. SCHMIDT

J. W. ZUBER
Circulation Manager

MAIN OFFICE

Penton Building, Cleveland

BRANCH OFFICES

New York . . . 220 Broadway
Chicago . . Peoples Gas Building
Pittsburgh . 1800 Koppers Building
Detroit . 1010 Stephenson Building
Washington . National Press Building
Cincinnati . . . 582 Sinton Hotel
San Francisco . . . 2413 Milvia St.
Berkeley, Calif., Tel. Berk. 7354-W
London . . . . Caxton House, Westminster, S.W. 1
Berlin . Berlin, N.W. 40, Roonstrasse 10

• • •

Published by THE PENTON PUBLISHING CO., Penton Building, Cleveland, Ohio. JOHN A. PENTON, Chairman of Board; E. L. SHANER, President and Treasurer; J. R. DAWLEY and G. O. HAYS, Vice Presidents; F. G. STEINEBACH, Secretary.

Member, Audit Bureau of Circulations; Associated Business Papers Inc., and National Publishers' Association.

Published every Monday. Subscription in the United States, Cuba, Mexico and Canada, one year $4, two years $6; European and foreign countries, one year $10. Single copies (current issues) 25c.

Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879. Copyright 1938 by the Penton Publishing Co.

STEEL

FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW

Contents

Volume 103—No. 12 **September 19, 1938**

READER COMMENTS 17

AS THE EDITOR VIEWS THE NEWS 21

NEWS
- $200,000 Paid in Lincoln Welding Competition 23
- Present Standing of European Powers in Steel Production 25
- New High in Oil Equipment Exports 26
- Failure of Purge May Strengthen Independent Action in Congress 27
- Metal Trades Job Stabilization System Spreads 28
- Steelworks Operations for the Week 29
- Men of Industry 30
- Obituaries 31
- Scrap Industry Sees Further Recovery 35
- Meetings 35

WINDOWS OF WASHINGTON 33

MIRRORS OF MOTORDOM 37

EDITORIAL—Labor Trend to Independent Unions 40

THE BUSINESS TREND
- Activity Index Reflects Holiday Interruption 41
- Charts and Statistics 41-43

TECHNICAL
- Electric Furnace Design 44
- Press Bends Boiler Plate 142

PROGRESS IN STEELMAKING
- Remote Temperatures 63

HEAT TREATING
- Making Springs 66

JOINING AND WELDING
- Transformer Tanks 74

MATERIALS HANDLING
- Bus Fabrication 78
- Electric Fork Trucks Are Used to Upend Coils 51

NEW METAL PRODUCTS 84

INDUSTRIAL EQUIPMENT 86

IRON AND STEEL ENGINEERS' CONVENTION FEATURES 92-122

MARKET REPORTS AND PRICES 145
- The Market Week 146

BEHIND THE SCENES 156

CONSTRUCTION AND ENTERPRISE 166

INDEX TO ADVERTISERS 174

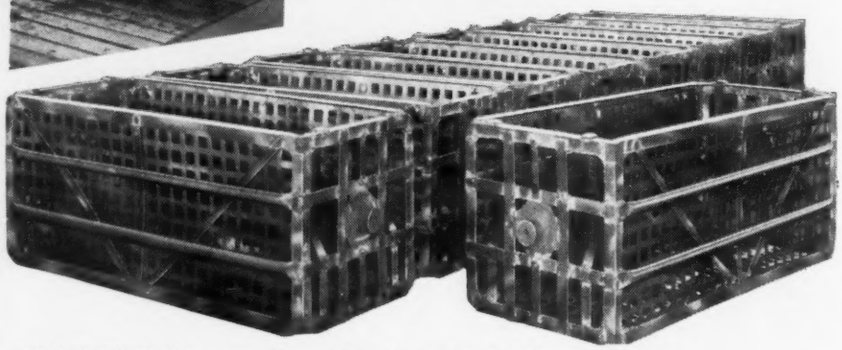
PRODUCTION · PROCESSING · DISTRIBUTION · USE

STOVE PARTS, STAMPINGS and STEEL . . .

. . . pickled in WELDED MONEL

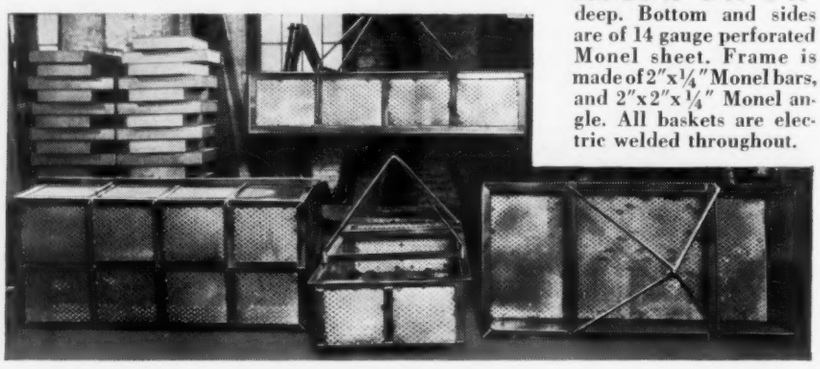
STOVE PARTS—These all-welded Monel pickling baskets are used by the Glenwood Range Co., Taunton, Mass., in pickling range parts prior to enameling. The tanks are also fabricated from solid Monel plate, with all joints welded. They contain cold hydrochloric acid and have been in use for seven years.

This durable, light weight construction cuts pickling costs on a wide variety of products



STAMPINGS—Here are shown nine of ten Monel pickling baskets in use at the Granite City, Illinois, plant of National Enameling and Stamping Company. These baskets, used for pickling stamped steel hollow ware prior to enameling, weigh only 400 lbs. each, yet carry loads up to 1000 lbs. All ten baskets are of welded construction, using 130X Monel Metallic Arc Welding Rod.

STEEL—Shown in this photo are four of five Monel pickling baskets used in the cold drawn department of a prominent Eastern steel mill. The baskets are 76" x 34" x 16" deep. Bottom and sides are of 14 gauge perforated Monel sheet. Frame is made of 2"x¼" Monel bars, and 2"x2"x¼" Monel angle. All baskets are electric welded throughout.



Because of its rugged strength and resistance to corrosion, Monel is widely used for all types of pickling equipment. It assures *lasting strength* with *light weight*, less trouble, and a minimum of repairs and replacements. Write for further details. Ask for "Equipment Designs for the Pickle House" and "A Good Start to a Better Finish". Address:

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N.Y.

Monel is a registered trade-mark of The International Nickel Company, Inc., which is applied to a nickel alloy containing approximately two-thirds nickel and one-third copper.

MONEL

News Flashes

Steady Feet on Sloppy Floors

Something new underfoot—it consists of Monel sheet to which are spot welded Monel buttons on 3" centers. Useful for deck applications and galleys afloat, it promises useful properties for industrial applications where spillage of corrosive agents not only tends to make floors slippery, but corrodes them.

Nickel-Clad Steel Pans

In one system of air conditioning, a lithium chloride solution is used to absorb moisture from the air. When the solution becomes saturated the excess moisture must be driven off at a temperature of about 240 deg. F., a point where the lithium chloride becomes highly corrosive. Pans made of nickel-clad steel plate are used for this purpose, replacing other materials which failed in short order.

Ni-Hard Grids on Sand Blast Tables

Grids on rotating sand blast tables of "Ni-Hard" (sand-cast) show many times the service life of ordinary chilled iron.

Monel Bolts won't Freeze

In Chicago, hot rolled Monel rod 1 inch in diameter is forged into special bolts to hold down manhole covers. Monel is used because of its resistance to corrosion and because it does not freeze or rust into the bolt hole.

Longest Bridge uses Nickel Steel

Longest steel bridge in the world is the San Francisco-Oakland Bay structure—really two bridges joined by a tunnel through an island. In its construction, 3,680 tons of 3½ per cent nickel steel were used for structural members, and 370 tons of nickel-chromium steel for pins in the cantilever portion of the bridge.

As the Editor Views the News

■ MILD upswing again was reflected in the volume of business last week. Steel ingot production rebounded from the Labor day lull to 46 per cent, the highest rate (p. 29) since November of last year. August, usually a dull month for the machine tool industry, was the best of the year in volume of new business (p. 29) and the third successive month registering increased business. . . . Prices so far announced on 1939 automobiles (p. 37) are down slightly to encourage buyers. First labor trouble of the 1939 automobile season developed at a time when employment in automobile plants is moving steadily upward; a sitdown strike that threw 17,000 men out of work resulted when union stewards were dismissed for instigating a slowdown on the production line.

• • •

The European war scare last week caused several hundred British industrialists, engineers and metallurgists (p. 25) to cancel their proposed visit to this country next month. . . .

European Steel Today

Germany has increased her steel output by 50 per cent since 1915. This gain, however, is far overbalanced (p. 25) by increases of 333 per cent by Russia, 51 per cent by the United Kingdom, 613 per cent by France, 3815 per cent by Belgium. . . . Important development last week was the distribution of $200,000 among 382 winners in a contest (p. 23) for best papers on electric arc welding. New information accumulated as a result of the contest indicates possible savings of $1,600,000,000. . . . Plastics are winning broader application (p. 38) in automobile construction.

• • •

Complete failure of the President's purge is hailed by industry (p. 27) as an almost certain guaranty that the next congress will exhibit a more independent attitude than has been manifested at any time since 1931. . . .

Means More "Backbone"

As details of the national economic committee's proposed agenda come to public view (p. 33) it becomes apparent that the coming study of business and industry is to be of a sweeping character. . . . How long can the government continue deficit spending at the present rate? A study (p. 27) indicates the end cannot be indefinitely deferred. . . . Worthy of close study (p. 28) is the job-stabilization plan of the National Metal Trades association. . . . Next year's triple mill supply convention, May 17-23, is to take the form (p. 35) of a cruise to Bermuda.

• • •

Of paramount importance when deciding on an electric furnace is selection of the proper type for the work to be done. After the correct selection has been made it pays (p. 44) to observe correct principles of design. . . .

Importance Of Design

Gasoline-electric fork trucks are found in a large tin plate plant to be economical units (p. 51) for handling coils in process. . . . Increasing use in forging, heat treating, rolling and other operations, is being made (p. 63) of recently designed equipment which measures temperatures from a distance. . . . Several specialized furnaces now are used (p. 66) in forming and heat treating in the manufacture of springs. . . . Cleaning time after welding is reduced 20 to 60 per cent (p. 77) by a new compound which prevents weld spatter from adhering tightly.

• • •

Change in design of a transformer tank, in addition to improving the tank, has resulted (p. 74) in manufacturing economies. The new tank is produced with half the number of operations and one-fourth the amount of welding. . . .

Bus Weight Reduced

Weight of a bus has been reduced 2000 pounds (p. 78) through changes in materials specifications. . . . New application of an old principle is the use of a universal joint (p. 84) in the rotor of a petroleum pump, between two shafts which meet at an angle of 30 degrees. . . . Profit possibilities in equipment purchases may be calculated on a slide rule (p. 140) specially designed for this purpose. . . . An interesting new press bends steel plates more than 6 inches thick; it was required to help meet the growing demand (p. 142) for extreme high-pressure boilers.

E. L. Shaner

WHERE THE *Finish* IS THE *Start* OF THE SALE

Mary, Mary — some call her quite contrary. Probably she's just a sophisticated buyer.

Statisticians say that her influence affects more than 80% of all retail purchases. She's there when more than half the automobiles are bought. She's 80% of the department store customers, even selects or helps to select 34% of men's apparel. In fact, she controls 75% of the national wealth.

If your product is sold on Main Street it will pay you to take her critical eye into account.

When you buy steel sheets make sure of the finish, for it starts the sale that makes your profit.

Inland engineers will gladly aid in developing sheets of special physical properties and finish that will increase the sales appeal of your products.

INLAND STEEL CO.

38 South Dearborn Street, CHICAGO • District Offices: DETROIT • KANSAS CITY • MILWAUKEE • ST. LOUIS • ST. PAUL

SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

$200,000 Paid in Welding Competition; Ideas "To Save $1,600,000,000"

■ ONE of the most unique competitions in the annals of industry closed last week with the distribution of $200,000 by the James F. Lincoln Arc Welding foundation, Cleveland, for the most meritorious ideas on how to promote arc welding. The jury of award after judging the papers in the competition reported:

"The central committee of the jury of award of the James F. Lincoln Arc Welding foundation finds that saving to industry by arc welding, claimed by authors of papers, aggregates $1,600,000,000. This figure is arrived at after discounting some enthusiastic claims. It is an amazing figure and undoubtedly would have been much greater had all of the authors estimated gross savings from application of arc welding to their product."

Not all papers made it clear whether savings claimed for ideas they presented were "annual" or otherwise.

Awards numbering 382 were made by the foundation. Amounts ranged from $101.75 for honorable mention to $13,941.33, first grand award. Recipients included engineers, designers, architects, production managers, superintendents, draftsmen, shop foremen, mechanics, inspectors, welding operators, welding supervisors, owners of businesses, college professors, high school instructors, students and others.

Subjects of studies in the 44 divisions of the program represented practically every product and structure of industry.

First grand award of $13,941.33 went to Mr. and Mrs. A. E. Gibson, president and stockholder, respectively, Wellman Engineering Co., Cleveland. Their paper, "Commercial Welderies", entered in the Welderies classification, was judged as an outstanding treatise on all elements required to assure business and technical success to all users of welding throughout industry. It took first award in its Commercial Weldery subclassification and its main Weldery classification, as well as the first grand award.

London Engineers Awarded $11,397

An award of $11,397.06 was made to Anant H. Pandya and R. J. Fowler, engineers, Diagrid Structures Ltd., London. Their paper, "The All-Welded Grid Applied to Plane and Spatial Structures," it was stated in the announcement of the awards, "will doubtless usher in a new era in design of framing for roofs and floors of buildings, eliminating trusses and columns except at corners of bays.

"The design makes a saving of $60,000,000 available to industry," according to the authors. This paper took first award in its Structural Buildings subclassification and its main Structural classification, as well as the second grand award.

An award of $8852.94 was paid to Robert E. Kinkead, consulting welding engineer, Carnegie-Illinois Steel Corp., Cleveland, for his paper, "Industrial Machinery, Steel Making," in which he describes the use of carbon arc welding in a method of producing clad metals, which if adopted, it was stated, "would save industry $9,845,401 annually." The paper won first award in its Industry Machinery-Steel Making subclassification and main Industry Machinery classification, as well as the third grand award.

Award of $7326.46 went to L. J. Carey and Marvin Whitlock, foreman and engineer, respectively, American Air Lines Inc., Chicago, for their paper "Welded Aircraft Piping." The study shows a new stride forward in an industry not so familiar with arc welding as with other forms. The authors' paper took first award in its Aircraft Fuse-

lage subclassification and its Aircraft classification, as well as the fourth grand award.

The other 378 awards were spread over the 11 classifications of the program. In the Automotive classification a total of $14,957.93 was awarded in the four divisions—engines, bodies, frames and trailers. Aircraft awards totaled $13,787.90. Authors of papers in the Railroad classification received a total of $13,736.90.

Awards totaling $12,210.53 were made to authors in the Watercraft classification, including commercial and pleasure craft. Seventy-one authors received awards totaling $26,049.55 for studies of arc welding applied to subjects covered by the four divisions of the Structural classification — buildings, bridges, houses and miscellaneous structures.

In the Furniture and Fixtures classification, covering house and office furniture, awards totaled $10,684.28. In the Commercial Welding classification, the total amount awarded was $11,549.14 in the two divisions—one covering job shops, the other garages. The Containers classification, covering containers, contents stationary (tanks, etc.), and containers, contents moving (pipe lines, etc.), accounted for $12,719.28 of awards. Awards in the Welderies classification totaled $22,081.67.

Robert E. Kinkead
Awarded $8852.94 for his paper entitled "Industrial Machinery, Steel Making"

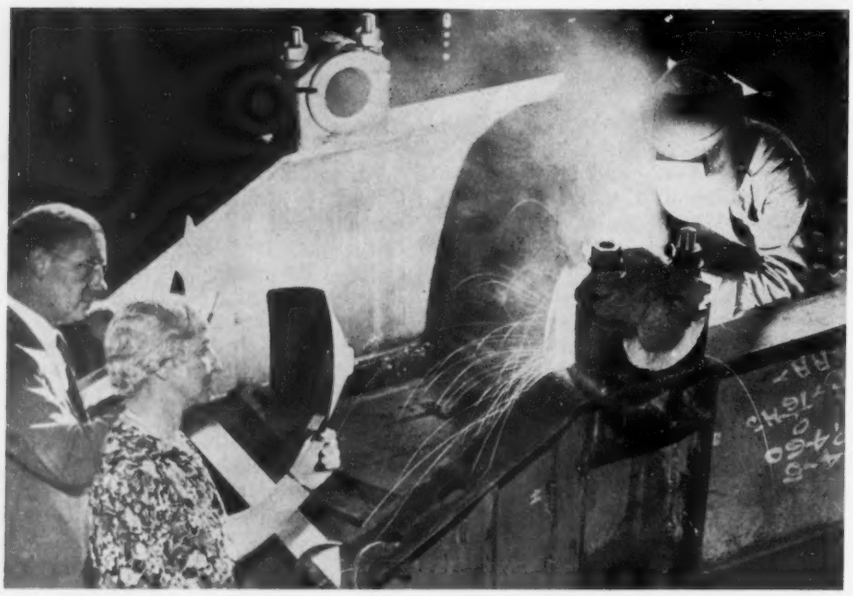
The Functional Machinery classification, open to design studies of arc welding applied to machinery used in several industries, accounted for $28,592.83 of awards spread over the ten divisions of the class—metal cutting, metal forming, electrical, prime movers, conveying, pumping and compressing, business machinery not otherwise classified, jigs and fixtures and machine parts. The Industry Machinery classification, open to design studies of arc welding applied to machines used exclusively in one of the industries covered by the class, accounted for the largest number of awards, 79, and the largest amount, $33,629.99.

The foundation's award program, which began 18 months ago, was judged by 31 engineering authorities from leading universities and colleges throughout the country.

In judging the papers in the competition, the jury vacated 16 awards, either because an insufficient number of papers were submitted in certain classifications, or because papers lacked merit. The money representing the vacated awards, therefore, was distributed proportionately over the 382 awards.

In the accompanying detailed listing of awards, it will be noted that top ranking places are omitted in certain subclassifications. This is because these papers also received awards in main classifications or in the grand awards, and are listed in their highest positions. The amount of the award in each case includes the awards in lower classifications.

Woman Shares in $13,941 Award for Welding Paper



■ **Highest award in the Lincoln Arc Welding foundation's competition last week went to A. E. Gibson and wife, shown at the left observing a welding operation. Mr. Gibson is president, Wellman Engineering Co., Cleveland. Their paper, entitled "Commercial Welderies", was judged "an outstanding treatise on all elements required to assure business and technical success of all users of welding throughout industry"**

Complete List Of Awards

Grand Awards

First, $13,941.33, A. E. Gibson, president, and Mrs. A. E. Gibson, Wellman Engineering Co., Cleveland; second, $11,397.06, Anant H. Pandya and R. J. Fowler, engineers, Diagrid Structures Ltd., London; third, $8852.94, Robert E. Kinkead, consulting engineer, Carnegie-Illinois Steel Corp., Cleveland; fourth, $7326.46, L. J. Carey, foreman, and Marvin Whitlock, engineer, American Air Lines Inc., Chicago.

Classification A: Automotive

First, $3764.94, H. C. Wendt, chief engineer, Hackney Bros. Body Co., Wilson, N. C.; second, $2543.88, Fred S. Beach Sr., designing engineer, Northwestern Electric Co., Portland, Oreg.; third, $1729.84, C. A. Davis Jr., engineer, Caterpillar Tractor Co., Peoria, Ill.; fourth, $1526.33, Nelson Severinghaus, superintendent, Consolidated Quarries Corp., Lithonia, Ga.

Automotive Sub-Class A-1: Engines

First, $712.28, Boris Osman, student, Hyde Park, South Australia; second, $508.77, Earle S. Lee, welding foreman, Buda Co., Harvey, Ill.; third, $305.26, Hamilton Johnson, president, Uni-Cond Engines, Baton Rouge, La.; fourth, $203.51, Frank Adams, engineer, Fairbanks, Morse & Co., Beloit, Wis.; fifth, $152.63, Everett G. Smith, welding instructor, Louisiana State university, Baton Rouge, La.

Automotive Sub-Class A-2: Bodies

Third, $305.26, Harry Wunsch, mechanical engineer, Silent Hoist Winch & Crane Co., Brooklyn, N. Y.; fourth, $203.51, R. S. Rose, chief engineer, Wentworth & Irwin Inc., Portland, Oreg.; fifth, $152.63, L. J. Kline, vice president, Mercury Mfg. Co., Chicago.

Automotive Sub-Class A-3: Frames

Second, $508.77, Herman C. Frentzel, chief engineer, Heil Co., Milwaukee,

(*Please turn to Page* 52)

Steel Realignment in Europe; Central Powers Far Outweighed

■ "IRON is war gold." Thus a leading German war industrialist in 1918 pointed the conclusion that steel power is a decisive factor in war, often means victory or defeat.

What then was the standing of combatants in the World war and how has the picture changed in two decades? In 1915, all leading steel producers in Europe were rushing war production. In 1937, they again were going strong on steel for armaments. Inferentially, production in both years was near practical capacity.

Steel production figures in gross tons:

Allied Powers Group

	1915	1937
United Kingdom	8,550,015	12,964,000
Belgium	97,264	3,808,255
France	1,093,180	7,778,543*
Russia	4,041,437	17,497,047
Japan	600,000	5,719,488
Canada	912,755	1,352,345
Czechoslovakia		2,280,512
Italy	993,346	2,054,134
TOTAL	16,287,997	53,454,324

Central Powers Group

Germany†	13,049,266	19,536,244
Austria	1,931,666	625,000
Hungary	670,229	654,528
TOTAL	15,651,161	20,815,772

*Includes Alsace-Lorraine.
†Figures for Germany in 1915 include production of Germany, Luxemburg and Alsace-Lorraine; for 1937, Germany and Saar district.

Germany, No. 1 Central Power, has increased steel output 50 per cent since 1915, despite loss of ore reserves by the treaty of Versailles. Her World war allies, Austria, Hungary and unimportant others, are in a less favorable position. Total output of Germany, Austria and Hungary in 1915 was 15,651,161 tons; in 1937 it was 20,815,772 tons, an increase of 36 per cent.

On the other side: Russia has increased production 333 per cent, last year produced 17,497,047 tons to rank second in the eastern hemisphere. United Kingdom has increased output 51 per cent; France, 613 per cent; Belgium, 3815 per cent. Belgian and French production in 1915, of course, was restricted by German invasion.

Including Italy, Japan, Czechoslovakia and Canada, but not the United States, the output in the allied nations increased from 16,287,997 tons to 53,454,324 tons, or 228 per cent.

German steel production was crippled by loss at Versailles of the Alsace-Lorraine ore deposits. Since losing these, Germany has imported about 20,000,000 tons of ore annually, has lacked rich home ores. By annexation of Austria, however, she gained an estimated 200,000,000 tons in reserves, containing about 30 per cent iron. Austrian ore production has been about 2,000,000 tons a year, could be increased.

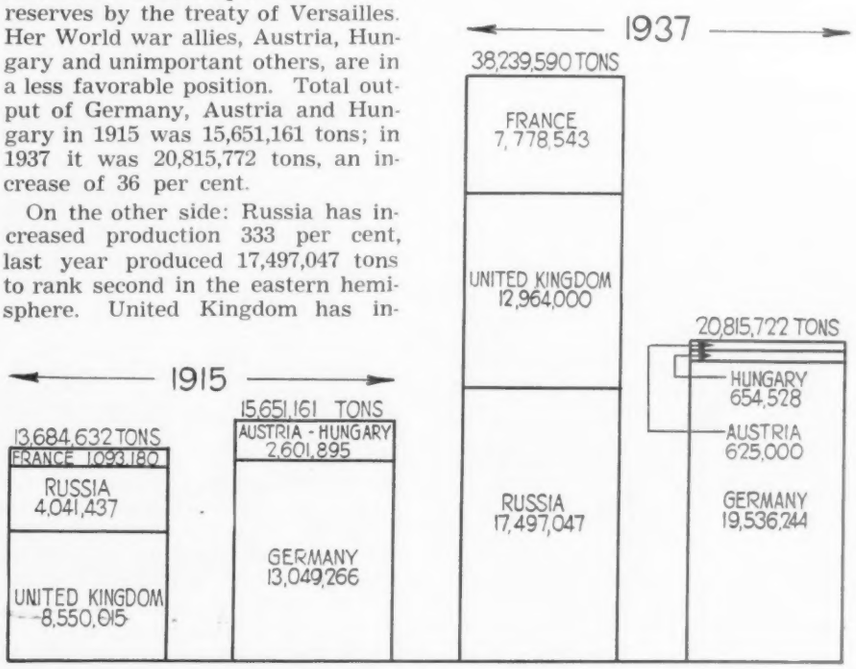
Trades With France

Recently Germany entered agreements with France whereby the latter sells Germany 7,200,000 tons of Lorraine ore annually, to be paid for with German coke. Lorraine ore has been exported to Germany for years. In 1937 exports reached 700,000 tons a month. Before the agreement was reached 1938 exports had dropped to 70,000 tons a month.

Germany, through Hermann Goering's reich works, is increasing capacity for steel production, preparing to utilize low-grade ores. Initial output of 1,000,000 tons a year is scheduled to be raised to 4,000,000 tons by 1940—the end of the 4-year plan. Greater Germany by 1940 may be able to produce 30,000,000 tons of steel.

Most spectacular gain in steel output has been Russia's. The Soviet's rapid rise to world's third largest steel producer has been accompanied by a corresponding increase in general industrial capacity.

Czechoslovakia last year reached an alltime record for the 20 years of its existence, produced 2,280,512 tons, slightly exceeding Italy's output.



■ **Steel production in 1915 and 1937. Output in United Kingdom and France together last year was 20,742,543 tons compared with 20,815,722 tons in Germany, Austria and Hungary. Table in the above column, left, shows how other countries figure in "the balance of power"**

BRITISH STEELMEN CANCEL VISIT TO UNITED STATES

LONDON

On government advice and because it is felt desirable that the key men of the iron and steel industry remain at home until conditions become more settled, the British Iron and Steel institute and British Institute of Metals have postponed their tour to the United States and Canada.

All plans for the meeting of the two British organizations with the American Iron and Steel institute and the American Institute of Mining and Metallurgical Engineers scheduled in New York Oct. 3-4, and the elaborate arrangements that were made for receptions in leading industrial centers, are called off.

The first of 300 visitors were to have sailed from England Sept. 17, and the others about a week later.

A similar disappointment was experienced last year when European steelmen who were to attend the sixth annual meeting of the International Congress for Steel Development in New York in June, as guests of the American Institute of Steel Construction, canceled their trip because of the unsettled political situation abroad. The meeting was held later in Prague.

TIN PRICE RISES ON WAR POSSIBILITIES IN EUROPE

Buying of nonferrous metals in the United States increased sharply last week, as a result of European war fears, following a period when the London markets were quiet. Domestic prices on tin rose almost 1 cent a pound. Copper and lead advanced moderately.

Armament buying by Europe has stimulated demand for nearly all nonferrous metals, beside which there has been an improvement in domestic requirements. Part of the advance in tin resulted from higher war risk premiums.

The United States consumed 86,-

663 gross tons of tin in 1937. It is the world's largest user of that metal. Yet it produces practically none within its own borders. Tin plate in 1937 absorbed 36,980 gross tons, solder 11,780 tons, bronze foil and collapsible tubes 11,470 tons, babbitt metal 3360 tons and other manufactures 10,250 tons. The remainder of the apparent consumption went into miscellaneous uses.

Imported from Straits

By far the greater portion of tin imports were from the Straits Settlements at the extreme southeast corner of Asia, 67,218 tons. The remainder was in small lots from other sources.

Secondary tin reclaimed by detinning and other metallurgical processes totaled 7250 net tons of pig tin and 20,770 net tons in alloys during 1936, the latest year for which figures are available.

No large stocks of tin are maintained in the United States, the average on hand in 1937 being 5116 gross tons, less than a month's supply. In fact, no large stocks are in existence anywhere in the world, the average world visible supply in 1937 being 24,555 gross tons.

An essential metal, normally dealt with in this hand-to-mouth manner, tin supply becomes a matter of concern in case of war interrupting ocean shipments. One factor of safety is that shipments from the Straits to the United States can be made across the Pacific, less likely to be involved than the Suez canal and the Atlantic.

During the World war trading in tin was stopped in all the metal exchanges for several weeks and the price practically doubled. Sufficient supplies were obtained to serve industry and no real famine developed, though there was uncertainty as to deliveries.

Average price of tin in New York during 1937 was 54.24 cents per pound, with a high of 66.625 cents and a low of 41 cents. The highest price on record was in 1918 when $1.10 was reached. The lowest of record was in 1896, at 13.70 cents.

Oil Equipment Exports Record

■ AMERICAN petroleum equipment manufacturers are continuing to ship products abroad in record volumes, according ot a semiannual review by the machinery division, department of commerce.

Unlike the market for other types of industrial machinery which is concentrated chiefly in the more industrialized countries, the demand for petroleum equipment, particularly the drilling and well machinery, arises wherever resources of oil exist.

Worldwide economic improvement, and expansion and developments in industry and transportation, are making increased demands upon present oil supplies, as well as upon existing operating equipment. Only a relatively few countries manufacture high grade petroleum well and refining machinery, and American manufacturers are obtaining a good share of the increased demand in world markets.

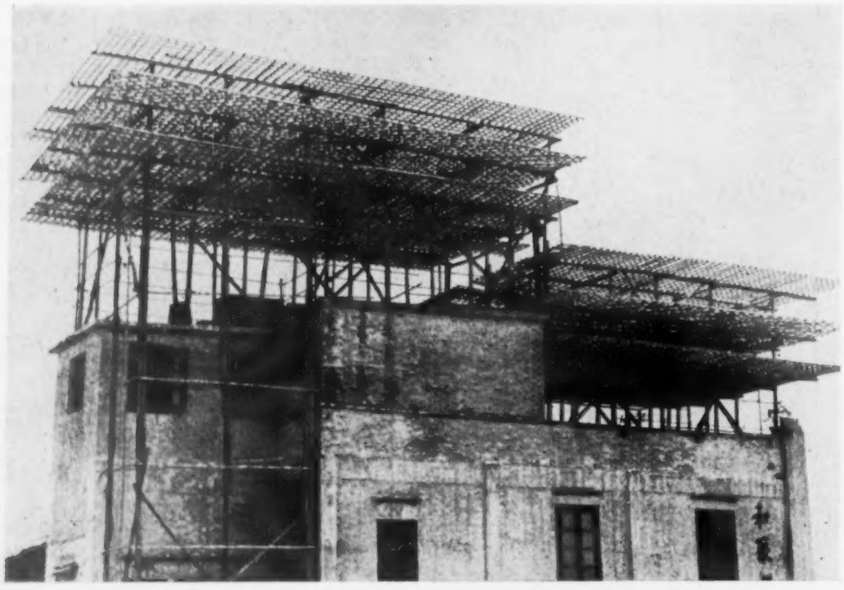
Gain 21 Per Cent

Exports of such equipment from the United States during the first six months of 1938 reached the record level of $21,008,415, a 21 per cent gain over the record January-June shipments last year valued at $16,453,988, and 39 per cent above the previous peak first-half year figure of $15,093,620 in 1930.

Much of the greater export deman so far in 1938 has been confined to drilling equipment as compared to other oil well and refining machinery. This is a comparatively new development in the trade, as prior to the past year or so American manufacturers generally shipped abroad less oil well drilling equipment than other oil well and refining machinery. The first 6-month foreign sales of petroleum and gas well drilling apparatus amounted to $12,374,417, approximately 50 per cent greater than the corresponding 1937 shipments valued at $8,300,973 and more than double the previous peak half-year exports aggregating $5,342,409 in 1930.

While the export gain in drilling equipment was distributed over many markets, outstanding increases were noted by the machinery division in the sales to a number of individual countries, particularly in South America, Asia, and Africa. Venezuela was our leading foreign market during the first half of 1938 as well as 1937, taking shipments valued at $3,471,723 and $1,866,720 in these two periods, respectively. Colombia ranked second through June of this year, the exports of drilling equipment to that country totaling $1,544,808, more than five times the comparable 1937 figure of $281,929.

Bomb Catchers in Canton



■ After repeated aerial bombings by Japanese, building owners in Canton, China, have erected these defenses. Several tiers of meshed steel rods, about the size of reinforcing bars, are stretched over buildings, and anchored with steel stanchions. NEA photo

Service Medals Awarded 327 Gary Veterans

■ In recognition of 25 years or more of service, Carnegie-Illinois Steel Corp. presented medals to 327 employes at Gary works. The awards were made at a series of luncheons from Sept. 8 to Sept. 16, by E. E. Moore, general superintendent of the works.

Among the recipients, 228 won 25-year medals; 88 won 30-year medals; 22 received 35-year medals; five took 40-year medals; and four received 45-year awards. Three women were included in the groups.

Failure of Purge May Strengthen Independent Action in Congress

■ PURGE SCORE: 8 to 0. Eight Democratic senators, blacklisted by the White House for failure to vote "yes" on all administration measures, last week had been renominated; no Democratic senator opposed by the President had lost. The purge was an unequivocal failure.

Senators renominated over the White House veto: Millard E. Tydings, Maryland; Walter F. George, Georgia; Ellison D. Smith, South Carolina; Guy M. Gillette, Iowa; Frederick Van Nuys, Indiana; Bennett C. Clark, Missouri; Pat McCarran, Nevada; Alva B. Adams, Colorado.

To this list might be added Augustine Lonergan, Connecticut. Mr. Lonergan opposed some New Deal proposals, was considered a purge target by the administration. But shortly before the Connecticut convention it decided not to take action against him.

New Deal senators defeated in contests involving 100 per cent loyalty tests or Presidential endorsement: William G. McAdoo, California, and James P. Pope, Idaho.

Senators renominated in New Deal tests: Claude Pepper, Florida; Elmer Thomas, Oklahoma; Robert J. Bulkley, Ohio; Mrs. Hattie Caraway, Arkansas: Alben Barkley, Kentucky.

Net score in the Democratic primary contests, plus probable Republican gains, gives assurance the opposition *bloc* in the senate next session will be larger than it was last spring.

Resentment by the conservative element in his own party over the abortive attempt to liquidate those solons who opposed the court packing, reorganization and other radical measures is considered likely to make the path of Mr. Roosevelt and the "kitchen cabinet" a rougher one for the next two years.

Industry necessarily pins its hopes on the conservative Democratic element in congress. When congress adjourned, 77 members of the senate were Democrats, 15 were Republicans, one was a Progressive, two were Farm Laborites and one was an Independent Republican.

Only 32 seats are to be filled in November. Democrats appear certain to retain a substantial majority.

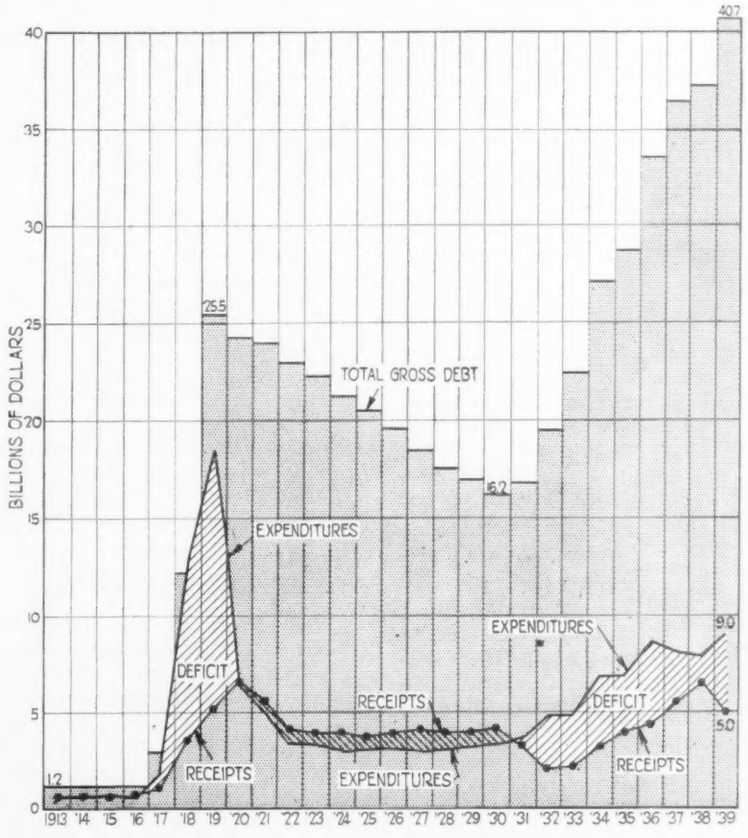
In the lower house, a somewhat similar picture prevails. Three outstanding anti-New Deal representatives, marked for defeat by the White House, were renominated. Two were defeated. Four staunch administration supporters were defeated despite Presidential blessings.

All the 435 representatives must stand for election and some early polls indicate Republicans will gain from 60 to 100 seats. At adjournment, the lower house contained 327 Democrats, 90 Republicans, seven Progressives, five Farm Laborites. There were six vacancies.

Several weeks ago, before primary results began to roll in, the New Deal's inner circle was planning Purge II. This was designed to break down the conservative elements in state party machines to insure 100 per cent New Deal delegations to the next national convention, allow Mr. Roosevelt to name his successor and preclude chances of nominating a Garner, a Harry Byrd or a Jesse Jones.

The rebuke administered the President by the voters, especially in Maryland where the issue was the clearest, will give Democratic senators and representatives assurance that independent voting is not "political suicide." Perhaps this will prove the most important result of the purge's failure.

Up and Up! Federal Expenditures, Deficit, Debt



■ **Step by step, the gross national debt has mounted throughout the "recovery" period. By June 30, 1940, it will have reached $43,000,000,000. For the current fiscal year, which ends June 30, 1939, a deficit of more than $4,000,000,000 is foreseen; for the fiscal year 1940 the deficit will be at least $3,000,000,000. Only during the World war period have expenditures and deficits been so large.**
Chart data, National Industrial Conference board, New York

Tells Industry's Story In Over 100 Speeches

■ More than 100 speeches telling the story of the American economic system have been booked since Jan. 1 by Dr. Allen A. Stockdale, National Association of Manufacturers speakers' bureau head. Eighty-one engagements already have been filled.

A former clergyman, Dr. Stockdale uses the "shirt-sleeve" method to gain background for his addresses. He regularly visits plants, meets and talks with owners, executives, foremen and workers.

Born in Zanesville, O., Dr. Stockdale was graduated from Boston university's school of theology, later studied at Oxford university, England. He has held pastorates in Boston, Toledo, O., Chicago and Washington.

Metal Trades Job Stabilization Spreading; Payroll Taxes Reduced

■ ADVANTAGES to both employers and employes are accruing through the National Metal Trades association's job-stabilization program. Chief among these are the saving in unemployment taxes and the providing of additional hours of work.

Essentially the plan sets up a clearing house for jobs among local employers. When workers must be laid off, the employer sends their names and qualifications to the NMTA bureau. When men are to be added, the employer sends the bureau a list of the jobs he wants filled.

The bureau personnel checks these lists against each other, compares types of jobs to be filled with the skills of the men to be laid off. Where the two listings fit in with each other, the bureau notifies the employer who wants men and the employer who is about to lay off men. Often workers are transferred to new jobs without loss of time.

First job-stabilization bureau was opened in Milwaukee four years ago and served as an experimental station for the plan. Wisconsin was the first state to enact unemployment insurance legislation. Last fall a second bureau was opened in Chicago and others now are being organized in Toledo, Cleveland, Cincinnati and Columbus, O., and in Indianapolis and Evansville, Ind. Plans are under way to extend the program to other cities in the Middle West and East.

Factors Spurring Program

Two factors behind the rapid growth: Employers are sincerely anxious to level out employment ups and downs; job-insurance laws in many states set up individual unemployment insurance reserves or individual accounts for employers. Generally after each reserve reaches a certain size, the employer pays the full amount of the payroll tax only when the fund is depleted by insurance payments to laid-off workers who have not been re-employed. Thus, job-insurance taxes are minimized for the employer who provides steady work for his men or finds other jobs for them.

Other benefits to co-operating employers: More adequate force of skilled personnel; creation of goodwill of employe and resultant improved labor relations; better government and community relations; and many other advantages which obviously result from stabilized employment.

The employe benefits because the plan gives as much assurance against unnecessary unemployment as possible; the program actually offers him free specialized employment bureau services.

The greater the number and variety of co-operating companies, the better the plan works. Consequently, the local NMTA branch throws the services of its clearing house open to allied groups. Local employers' associations, industrial associations and other organizations are encouraged to take part.

Operation and procedures of the various bureaus are kept as simple as possible—so much so that an employe may be transferred from one plant to another without knowing about the organization that kept him in employment. The older bureaus — Milwaukee and Chicago — have somewhat more elaborate systems, offer a more complete service. In Chicago, for example, workers are notified of job openings by written notices sent directly from the bureau.

W. E. Odom, William Odom Associates, Chicago, worked out and installed the Chicago bureau, and has been consultant in establishing other bureaus.

Steel President Breaks Ground

■ **Shovel controls were operated by J. L. Perry, president, Carnegie - Illinois Steel Corp., when first ground was moved for Colonial Village, $1,500,000 housing development at Clairton, Pa. Three hundred low-cost homes are to be built for sale to employes of Carnegie-Illinois' new Irvin works and to the general public. The Irvin tin plate division is working, and Mr. Perry said the entire mill will be in operation shortly**

PITTSBURGH CIO ORGANIZES NEW WPA WORKERS UNIT

WPA workers in the Pittsburgh district last week formed a new organization to replace all similar groups. Known as United Project Workers, it is headed by O. B. Allen, chairman, and R. J. Davidson, secretary-treasurer. Allen is president of the Pittsburgh chapter, Federation of Architects, Engineers, Chemists and Technicians, and Davidson is a CIO organizer. Both are members of the executive committee, Steel City Industrial Union council, central CIO body.

MODIFIED LEWIS PEACE PLAN ACCEPTED BY UAW

United Automobile Workers last week voted to accept a modified version of the John L. Lewis peace plan. Allan Heywood, regional CIO director, announced "an accord agreeable to everyone" had been reached in the union factional strife.

ACCUSED OF FORMING UNION

National labor relations board announced in Pittsburgh last week that a hearing on a complaint against National-Erie Corp., Erie, Pa., will be held Sept. 22 at the Erie county court house. Lodge 1609, Amalgamated Association of Iron,

Steel and Tin Workers, accused the firm of forming and giving support to a company union.

FINANCIAL

National Steel Corp., Pittsburgh, has declared a dividend of 25 cents per share on its capital stock. There are 2,168,117 shares outstanding. Dividend will be paid Sept. 30 to stockholders of record Sept. 23.

♦

Wheeling Steel Corp., Wheeling, W. Va., has declared a dividend of 50 cents a share on the $5 cumulative prior preferred stock, payable Oct. 1 to record Sept. 23. Regular distribution on the issue heretofore has been $1.25 a share. No action was taken on the old 6 per cent preferred stock.

♦

General Electric Co., Schenectady, N. Y., has declared a dividend of 20 cents a share for the third quarter, payable Oct. 25 to stockholders of record Sept. 23.

Valve and Foundry Company To Liquidate

■ After 38 years of manufacturing power piping equipment, valves and fittings, Pittsburgh Valve, Foundry & Construction Co. is to be liquidated. Equipment will be disposed of through Thomas J. Llewellyn, 911 Oliver building, Pittsburgh. In 1825 the Hall-Speer Foundry Co. was formed, which after a series of mergers and combinations became the Pittsburgh Valve, Foundry & Construction Co.

The plant is completely equipped with foundry, lathes, boring mills, planers, drills, milling machines, tapping machines, grinders and woodworking shop.

Chromium Steels Gain 90 Per Cent in Two Years

■ Production of finished chromium and nickel-chromium corrosion and heat-resisting alloy steels increased from 40,000 tons in 1935 to 76,000 tons in 1937, a gain of 90 per cent in two years, according to H. J. French, development and research division, International Nickel Co. Inc., New York.

In addressing the Northwest chapter, American Society for Metals, Minneapolis, Sept. 16, he described various trends in manufacture and processing of nickel alloy steels. Concerning welding he said:

"A comparatively few years ago joining of metals by welding was viewed with interest but suspicion. In a short time this condition has changed and now welding is an established process applicable to both carbon and alloy steels."

District Steel Rates

Percentage of Ingot Capacity Engaged in Leading Districts

	Week ended Sept. 17	Change	Same week 1937	Same week 1936
Pittsburgh ..	36	+ 4	84	72
Chicago	41.5	+ 3.5	83	72.5
Eastern Pa...	33	+ 2	63	48
Youngstown..	46	None	70	80
Wheeling	56	+ 7	89	92
Cleveland ...	48.5	+ 5	63	82
Buffalo	49	None	70	76
Birmingham..	57	+ 1	91	64
New England.	60	None	75	70
Cincinnati ...	65	+ 5	80	76
St. Louis.....	42	None	74	†
Detroit	67	None	95	95
Average....	46	+ 4.5	80	72.5

†Not reported.

August Machine Tool Orders Up 35 Per Cent

■ August machine tool orders were the highest since December and were 35 per cent above July, according to the National Machine Tool Builders' association, Cleveland. The association's index reached 120.9, compared with 89.6 in July.

August was the third successive month to show an increase. The three months' average trend also has turned slightly upward.

August Steel Shipments Increase 26.7 per cent

■ Shipments of finished steel products by United States Steel Corp. subsidiaries in August totaled 558,634 tons, compared with 441,570 tons in July, an increase of 117,064 tons, or 26.7 per cent. August shipments were 549,224 tons, or 49.5 per cent less than these in the month last year.

Shipments for eight months totaled 4,010,558 tons, compared with 9,903,884 tons a year ago.

U. S. STEEL CORP. SHIPMENTS

(Inter-company shipments not included)

(Tons)

	1938	1937	1936	1935
Jan.	518,322	1,149,918	721,414	534,055
Feb.	474,723	1,133,724	676,315	583,137
Mar.	572,199	1,414,399	783,552	668,056
April	501,972	1,343,644	979,907	501,728
May	465,081	1,304,039	984,097	598,915
June	478,057	1,268,550	886,065	578,108
July	441,570	1,186,752	950,851	517,794
Aug.	558,634	1,107,858	923,703	624,497
8 mo.	4,010,558	9,908,884	6,905,904	4,726,290
Sept.	.....	1,047,962	961,803	614,853
Oct.	.....	792,310	1,007,417	686,741
Nov.	.....	587,241	882,643	681,830
Dec.	.....	489,070	1,067,365	661,515
Y'rly adj.	....	.....	†40,859	†23,750
Total	.....	12,825,467	10,784,273	7,347,549

†Deduction.

PRODUCTION

■ STEELWORKS operations last week increased in seven centers and held steady at five, the national rate advancing 4.5 points to 46 per cent, reflecting renewed operations after Labor day. This is the highest rate since the week ending Nov. 6, 1937, when it stood at 47 per cent.

Youngstown, O. — Held at 46 per cent with indications for 1 point higher this week. Carnegie-Illinois Steel Corp. will start its eleventh open hearth at Ohio Works and Republic Steel Corp. its fifth at Youngstown. One of the latter may suspend shortly for repairs. Youngstown Sheet & Tube Co. probably will suspend its bessemer this week.

Cleveland — Advance of 5 points to 48.5 brought operations to the highest point since the week of Nov. 6, 1937.

Pittsburgh—Up 4 points to 36 per cent. At the close last week the rate was slightly above this average. Jones & Laughlin Steel Corp. has lighted another blast furnace, giving 15 out of 50 active in the district.

Birmingham, Ala.—Up 1 point to 57 per cent, with 13 open hearths in service. Indications are for higher production soon.

Chicago—Advanced 3.5 points to 41.5 per cent, the best rate since November.

Buffalo — Unchanged at 49 per cent. Bethlehem Steel Co. has lighted a fourth blast furnace at its Lackawanna plant.

St. Louis—Steady at 42 per cent, with an increase indicated for this week.

Cincinnati—Up 5 points to 65 per cent.

Central eastern seaboard — Advanced 2 points to 33 per cent. Some mills are less active than late August, however.

New England—Additional active capacity by one works was offset by loss of one open hearth by another, the rate remaining 60 per cent.

Wheeling — Heavier schedule by one mill advanced the rate 7 points to 56 per cent.

Detroit—Held at 67 per cent for the third consecutive week. An increase is expected this week, when three additional open hearths are scheduled.

■ Californians participated Sept. 14 in celebrating an award to the Golden Gate bridge as the most beautiful monumental bridge built last year. The award was bestowed by the American Institute of Steel Construction in the form of a stainless steel plaque affixed to the bridge. F. H. Frankland, chief engineer of the Institute, made the presentation.

MEN OF INDUSTRY

THOMAS E. MILLSOP, president, Weirton Steel Co., Weirton, W. Va., has been elected to the executive committee of National Steel Corp., Pittsburgh. Other members of the committee are: George M. Humphrey, president, Hanna Iron Ore Co.; George R. Fink, president, Great Lakes Steel Corp.; Ernest T. Weir, chairman, National Steel Corp.

♦

Claude A. Marlowe has been appointed sales engineer by the A. W. Cadman Mfg. Co., Pittsburgh. He formerly was employed in the service parts division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

♦

John Pearce, formerly sales and service engineer, National Acme Co., Cleveland, has taken a position in the sales and service department of the Colona division of Pittsburgh Screw & Bolt Corp., Pittsburgh.

♦

J. W. Meriam, for 24 years vice president and secretary, Lincoln Electric Co., Cleveland, has retired from active service, although continuing as a director. A. F. Davis, vice president, has been elected secretary, and Frank K. Griesinger will handle credits and collections. Mr. Meriam joined the Lincoln company in 1914.

♦

Jesse M. Darke, director of the materials testing laboratory of Lynn, Mass., works of General Electric Co., was given a testimonial banquet Aug. 31, on the occasion of his retirement on pension after 46 years service. He is a charter member of the American Foundrymen's association, a member of the American Society for Testing Materials and has been a member of American Society for Metals and American Chemical society.

♦

Charles J. Graham, formerly president of the Bolt, Nut and Rivet Manufacturers' association and vice president of the Pittsburgh Screw & Bolt Corp., Pittsburgh, more recently associated with the Pressed Steel Car Co., Pittsburgh, has been elected president of the Pittsburgh & West Virginia railroad, succeeding the late Frank Taplin.

♦

William A. Watson has been made general sales manager of National Refractories Co., Philadelphia, with offices in the Oliver building, Pittsburgh. He will devote most of his time to the Pittsburgh, Cleveland and Detroit areas. Midwest Refractories Co., of which Mr. Watson has been president, will continue its activities at 638 Union Trust building, Cleveland, in sales of products not competitive with those of National Refractories Co.

Thomas E. Millsop

♦

D. P. Boydston has been appointed manager of sales by Northwestern Steel & Wire Co., Sterling, Ill.

♦

Dr. Arthur E. Schuh has been appointed director of research by United Pipe & Foundry Co., Burlington, N. J. Since 1929 he has been associated with Bell Telephone Laboratories, New York, and before that with Western Electric Co., Chicago. He is a member of American Society for Testing Materials and American Chemical society.

R. B. Barnett

Who has resigned as assistant manager of sales, Union Drawn Steel division of Republic Steel Corp., to become manager of the Buffalo office of Peter A. Frasse & Co. Inc., New York, as reported in STEEL, Sept. 5, p. 30. Mr. Barnett began as an employe of the Frasse company in 1914. He was made manager of its cold-finishing mill at Hartford, Conn., in 1916. This mill was absorbed by Union Drawn Steel Co., which later became a division of Republic, Mr. Barnett continuing his association with Union Drawn

♦

H. B. Spackman has been advanced from general sales manager to vice president in charge of sales and advertising by Lyon Metal Products Co., Aurora, Ill. He joined the company in June, 1937, having been general sales manager, steel sales division, United States Gypsum Co., Chicago.

♦

Abbott F. Riehle has been made sales manager of the Smootharc welder and welding electrode division of Harnischfeger Corp., Milwaukee. For ten years he was in charge of sales and management of Riehle Bros. Testing Machine Co., Philadelphia, recently taken over by American Machine & Metals Inc., Philadelphia.

♦

Walter F. Bugenhagen has been appointed general sales manager, Aluminum Goods Mfg. Co., Manitowoc, Wis., manufacturer of aluminum castings and stampings and moldings of stainless steel. He joined the firm as an office boy in 1910. He succeeds the late Carl F. Isselman.

♦

Charles F. Lanter has been appointed assistant district sales manager of the Colorado Fuel & Iron Co. at Fort Worth, Tex. He will be associated with Ira I. Paddock, district sales manager. Offices are at 1103 Fort Worth National Bank building.

♦

Sidney B. Blaisdell has been appointed New England sales representative for Fidelity Machine Co., Philadelphia. Offices will be established at 228 Aborn street, Providence, R. I. He has been mechanical engineer in the main plant for 12 years.

♦

George S. Jameson, superintendent of order and stores department, Lynn, Mass., works of General Electric Co., was honored Sept. 1, by a reception and banquet on completion of 50 years of service. He was presented a check and other gifts. The banquet was attended by 400 friends, including representatives of many companies which had dealings with Mr. Jameson's department.

♦

Thomas H. Blair, works manager of the Brooklyn plant of E. W. Bliss Co., has been made sales manager for the company's Canadian activities, with headquarters in the Commerce and Transport building, Toronto, Ont. He will also handle relations with the plants in Paris and London.

♦

James A. Downey, safety engineer for Sloss-Sheffield Steel & Iron Co., has been elected president of the

Birmingham Safety Engineers' club, succeeding Frank E. Cash, of the United States bureau of mines. J. L. Shores, Alabama Power Co., has been made vice president. Hubert E. Mills, Alabama Mining institute, was re-elected secretary-treasurer.

♦

Dr. Richard M. Wick has joined the staff of the development and research department, Bethlehem Steel Co. He was associated with the national bureau of standards since 1929. For several years he was consultant on protection and surface treatment of metals for the bureau of aeronautics, navy department, principally at the naval aircraft factory in Philadelphia.

♦

C. L. Volkman, associated with Pollak Steel Co., Cincinnati, O., in a sales and advertising capacity for more than 20 years, has been appointed manager of the fence post

C. L. Volkman

division and will continue as manager of construction materials. In the fence post division he succeeds C. G. Talbott, who has retired because of illness.

♦

L. V. Black has been appointed superintendent of the electrical department, Bethlehem plant, Bethlehem plant, Bethlehem Steel Co., succeeding A. J. Standing, deceased. Mr. Black was graduated from Penn State college in 1914 and immediately entered the employ of Bethlehem company, advancing to assistant superintendent of the electrical department.

♦

Frank B. Williams Jr. has been appointed vice president in charge of merchandising by Westinghouse Electric & Mfg. Co., with headquarters in Mansfield, O., succeeding Arthur E. Allen, resigned. He has resigned as vice president and sales manager of Diehl Mfg. Co., electrical division of Singer Mfg. Co., Elizabethport, N. J. Westinghouse merchandising division conducts the

Frank B. Williams Jr.

business of the company in refrigeration, air conditioning, ranges, heating appliances, fans and allied household and office electrical products, with plants in Mansfield and Springfield, Mass.

♦

Professor Charles Derleth Jr., dean of the college of engineering, University of California, Dr. Otis E. Hovey, consulting engineer, New York, and Dr. Aubrey Weymouth, consulting engineer, New York, have been appointed members of the technical advisory board of the American Institute of Steel Construction. The board consists of 30 nationally recognized members of the academic, architectural and engineering professions, and of rolling mills, steel fabricators and inspection engineers. Its object is coordination of technical engineering requirements.

DIED:

M. B. KELLY, in Pittsburgh, Sept. 13. He was founder and president of the American Steel Co., Pittsburgh. He started as an office boy for the Pittsburgh Brass Co., in 1886, later becoming affiliated with Zug & Co., pig iron producers. In 1901 he started in business for himself and in 1902 organized the American Steel Co.

♦

Isaac S. Mayfield, 63, founder of Victory White Metal Co., Cleveland, Aug. 30.

♦

Vincent W. Allen, 49, assistant works manager for Bridgeport Brass Co., Aug. 25, in Waterbury, Conn.

♦

T. Earl Coty, 39, in Cleveland recently, following an automobile accident. He was president, Coty Machine Co., Watertown, N. Y.

♦

Frank R. Decker, 47, in New York, Sept. 2. He was vice president of H. Boker & Co. Inc., hardware, New York, with which he had been associated since 1910.

♦

Eugene W. Butler, 47, in Latrobe, Pa., Sept. 7. Mr. Butler was vice-president in charge of operations, McFeely Brick Co., Latrobe, for the past 19 years.

♦

William H. Bowe, 74, president of the Herrick Co., Boston, at Melrose, Mass. Two years ago he celebrated his fiftieth year with the company. He was also past president of the New England Iron and Hardware association.

♦

William Gerhauser, 87, in Cleveland, Sept. 6. He was a pig iron merchant in Detroit until retirement in 1920 and since had made his home at Toms River, N. J. He was the father of William H. Gerhauser, president, American Shipbuilding Co., Cleveland.

♦

Edward J. Whittaker, 66, in Cleveland, Sept. 13. He formerly was superintendent for Brown Hoisting Machinery Co., Cleveland. When that company moved to Bay City, Mich., he became sales engineer for American Crucible Products Co., Lorain, O.

♦

Thomas Macbeth, 80, in Cleveland, Sept. 11. Associated with his father in the Macbeth Iron Co. he later became its president. In 1909 this was consolidated with the Bruce-Merriam-Abbott Co., to form the Bruce-Macbeth Engine Co., manufacturer of gas engines, Mr. Macbeth being made president.

♦

R. N. McDonough, 67, in San Antonio, Tex., recently. Starting business with Sloss-Sheffield Steel & Iron Co., he was associated successively with Tennessee Coal, Iron & Railroad Co. and Republic Iron & Steel Co. In 1910 he organized the Self-Fluxing Ore Co., later sold to Gulf States Steel Co. More recently he organized McDonough Ore & Mining Co., which merged with Alabama Lime & Stone Co.

♦

Edwin Henry Martin, 74, in Buffalo, July 30. Born in Waybridge, Eng., he moved to Cleveland in boyhood and was an early graduate of Case School of Applied Engineering. He was given the degree of metallurgical engineer in 1892 and became superintendent for Lukens Steel Co., Coatesville, Pa. In 1899 he built the Diamond State Steel mill at Wilmington, Del. and in 1901 was appointed metallurgical engineer for Carnegie Steel Co.

In 1904 he joined the Lalance & Grosjean Mfg. Co., Woodhaven, N. Y., as superintendent and in 1908 went to Cleveland with the Upson Nut Co. He built the plant of the Buffalo Bolt Co. in 1919.

MUSIC WIRE

BY

WASHBURN

Washburn wire makers are skilled craftsmen who have been schooled by long experience in the highest standards of quality workmanship. Talent and the most up-to-date equipment produce clean, uniform wire . . . straight throughout the coil, and held to close tolerances in all physical requirements.

The operations of making Eagle Music Wire are exercised with extreme care. To maintain a bright, clean surface, the finished wire is handled with gloves to prevent perspiration marks which lead to rust and finally to surface pitting.

Specify Eagle Music Wire for superlative quality.

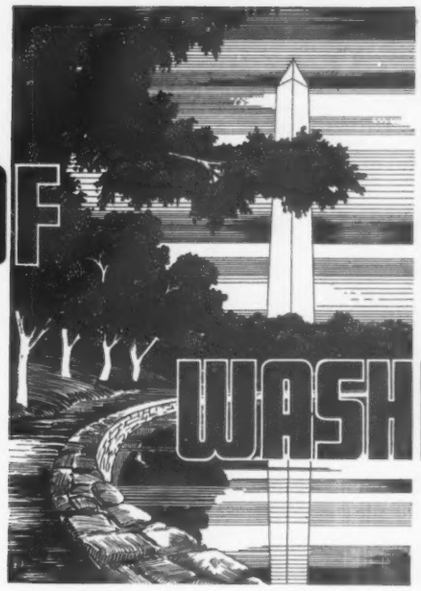
WASHBURN WIRE CO., PHILLIPSDALE, R. I.

WASHBURN WIRE CO., Inc., NEW YORK CITY

Washburn

CLEAN UNIFORM BILLETS - STRIP - RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

WINDOWS OF WASHINGTON



BY L. M. LAMM

Washington Editor, STEEL

WASHINGTON

■ MEMORANDUM setting forth the proposed scope of national economic committee's inquiry into the monopoly situation has been submitted by the commerce department.

Department officials believe the committee should study and investigate the patent system workings with particular reference to its bearing on concentration and control problems.

It should examine, so far as practical, the character of original ownership and latter assignment, if any; the record of patents with respect to use or suppression; the utility of patents in connection with the definitions of price market allocations, customer classifications and similar controls exercised by the patentee; the operation of the patent system with respect to the character of judicial enforcement of patent rights; and such other studies that may demonstrate the effect of the patent system on the relative position of the small and large enterprises.

Should Study Vital Statistics

Officials in charge of this monopoly work also believe the department should undertake a study to determine the relationship between size and the financial experience of companies through periods of changing business conditions. The suggestion is that this study should particularly concern itself with the behavior of working capital with respect to cash and inventory position and the resources available to various types and sizes of enterprises to carry them through periods of financial strains. Further study should be made, it is believed, of the fixed capital position of large and small enterprises, examining the nature and behavior of co-operative surplus, depreciation and the processes involved in the formation of capital by the individual enterprise.

Commerce department officials think these studies should be supplemented by such other studies as may serve to provide evidence on the differences in financial policies and status according to the size of the enterprise and the effect of these differences on the performances of business structure and on the level of business activity.

The department also, according to its experts, should study the vital statistics of business, the development of new enterprises, the degree and character of survival of large and small enterprises and the extent of the absorption by merger or acquisition. Survey should be made also of the degree to which such factors as changing consumer demand, shifting market areas, technical developments and competition create instability. Furthermore, it is believed the inquiry should consider changing forms of enterprises, namely, proprietorships, corporations and co-operatives.

Suggested plan is that the department also should gather and organize data relative to the operations record in recent years, as indicated by national income, distribution of individual incomes, record of individual industries, and record of individual enterprise. The department should also study the degree of utilization of natural resources, productive facilities and labor supply.

Suggestion also is made that the department should study the business structure with a view to determining the extent of large scale operation, of concentration and of integration within various branches of industry and subdivisions; extent to which concentration influences cost, stability of income, technical progress and other social and economic factors; the nature and extent of forms of partial concentration, such as trade associations, purchasing groups, co-operatives and similar groups, and their effects on business practices and processes; the extent and degree of other extents of control through devices such as retail price maintenance, exclusive agency controls; joint advertising controls and the like; and such other studies that may reflect and assist in evaluating the influences of size, concentration and integration on the functioning of productive and distributing machinery.

Also recommended is study of the extent to which the post-war economy of the United States has been affected by changes in the international situation. It is believed this investigation should embrace the examination of the importance of foreign trade to the domestic economy and an analysis of the current and future effects on our business structure of such foreign developments as the growth of international cartels.

Will Announce Hearings

The department suggests probing of the branch factories movement and the like and an examination of the influences of export activity on the stability of operation and earnings of individual companies and industries; a study comparing the domestic and export price policies of American companies engaged in foreign trade; and the study and extent of foreign ownership and control of American industries and of American participation in foreign industries.

The plan suggests further that the department should investigate degree of concentration development in foreign conditions and the public

policies which have been adopted with reference to this condition.

There was no indication at the end of last week as to just when the full membership of the committee will hold its next meeting. It has been whispered about that at the next meeting the committee will announce the date for beginning the public hearings. Indications are that the date will be after Oct. 15. The committee expects to give industry at least 30 days notice before beginning hearings.

ANDREWS NAMES FIRST INDUSTRY COMMITTEE

Elmer F. Andrews and his new hours and wages division of the labor department made some progress last week. The administrator appointed its first committee—for the textile industry—composed of 21 members, representing the employer, the employe and the public.

The steel industry will not be interested in the textile committee as such, but is bound to be interested in the committee's operating method. Mr. Andrews explained that because there are 21 members of the first committee, it is no sign that number will be taken as precedent. Other industry committees will be larger or smaller as the occasion requires.

An estimated 1,300,000 wage earners are employed in the textile industry. The committee has been appointed to recommend a minimum wage schedule for the industry, not less than 25 cents an hour nor more than 40 cents an hour, which will not substantially curtail employment.

This committee, which, as before stated, is the first to be appointed under the fair labor standards act of 1938, was requested by representatives of both employers and employes in the industry.

It is expected available facts regarding wage conditions in the industry will be called for presentation to the committee within two or three weeks. Form of the investigation, which the committee will follow, will be determined by the committee itself under procedures laid down by the administrator, but it is expected the committee or subcommittees will hold hearings at points convenient to the business and labor groups affected. Technical committees are to be appointed by the administrator to assist in dealing with special problems.

Bureau of labor statistics, as of April 1937, show 26.7 per cent of the cotton textile workers receive less than 40 cents an hour and that 4.6 per cent receive less than 25 cents an hour. Wage studies in other industries are under way in the bureau at the administrator's request.

In order to make its recommendation, the textile committee will make its own investigation of conditions in the industry and may, if it chooses, summon witnesses and receive evidence. The administrator and the bureau of labor statistics will furnish information on existing wage rates, competitive conditions and other factors.

Under the procedure which has been worked out by Mr. Andrews the committee will have no authority to recommend a purely regional wage differential. Under the law, however, it may recommend classifications for the purpose of fixing for each classification the highest minimum wage rate (not more than 40 cents an hour) which will not substantially curtail employment and will not give a competitive advantage to any group in the industry.

In determining whether or not classifications should be made, in making the classifications and in determining proposed minimum wage rates, the committee must consider among other things the following:

Competitive conditions as affected by transportation, living, and production costs;

The wages established for work of like or comparable character by collective labor agreements negotiated between employers and employes by representatives of their own choosing;

Wages paid for work of like or comparable character by employers who voluntarily maintain minimum-wage standards in the industry.

Andrews To Approve Report

When the committee has finished its investigation, it will file a report of its recommendations with the administrator. The administrator will then give notice to interested persons and allow them to be heard. If he finds the recommendations are made in accordance with the law, are supported by the evidence received at the hearing and will carry out the purposes of the law, he will approve the recommendation and make it effective by a minimum wage order.

If, taking into account the same factors, he disapproves the recommendation, he may refer the question back to the same committee for another recommendation or may appoint a new committee. The administrator, himself, cannot change a recommendation.

Late last week Mr. Andrews received a telegram from the National Battery association notifying him the storage battery industry wants to set a minimum factory wage of 40 cents an hour, effective Oct. 24. The administrator was delighted and expressed the hope other industries might follow this lead.

DECISION ON STEEL WAGES AGAIN DELAYED

There has been another delay by the public contracts board in reaching a decision on steel wages under the Walsh-Healey act.

It was expected a decision would be announced the latter part of last week, but board members are still predicting a decision will be announced within a few days.

Current understanding is that regional rates will be announced but that no differentials, as between large and small mills, will be made. Procedure will be for individual companies to ask exemptions under section 6 of the act. Continued delay in announcing the decision in this case is interesting in view of the fact that at the hearings early in August, Thomas Holland, board chairman, several times announced a decision would be reached in a few days.

BUDGET HEARINGS WILL START THIS WEEK

Director Daniel Bell and his assistants of the budget bureau this week will start their long-lasting hearings of various government organizations on budgets for the fiscal year 1939 and which will be effective next July 1.

Bell and his organization sit as a court while various government officials appear before them, in almost every case, asking for more appropriations than they had last year and, incidentally, asking for more than they expect to get.. Purpose of the Bell organization is to cut government appropriations to the bone before making its recommendations to congress.

In rare instances does congress appropriate for any government department more than the budget bureau recommends, so it is up to the government officials to get as much out of the budget bureau as possible. These hearings will go on for several months. Several days after congress convenes in January, the President will submit to the congress governmental expenditure recommendations which will be based on the recommendations made by the Bell budget bureau.

COMMERCE DEPARTMENT PREPARES FOR CENSUS

The commerce department is preparing to take the decennial census of 1940. The census will cost about $50,000,000 as compared with $40,000,000, ten years ago. More details will be contained in the 1940 census.

Census will cover population, occupations, unemployment, agriculture, irrigation, drainage, manufactures, mines and quarries, and business. Certain additional vital statistics activities which are dependent for their value upon enumerated population statistics are planned in order to present new and more comprehensive data for use in improving national health.

Scrap Sees More Trade Recovery

■ THE SCRAP trade's job is to provide the steel industry with an adequate supply of material at a reasonable price, declared E. C. Barringer, recently-elected secretary, Institute of Scrap Iron & Steel Inc., at its mid-year meeting, Hotel Pennsylvania, New York, Sept. 12.

He spoke at the dinner which followed the morning business session and the institute's national golf championship match in the afternoon at which H. D. Stalnaker, Pittsburgh representative, M. D. Friedman Co., Ashland, Ky., won the President's cup. Runners-up in this match were Max Pressler, Summer & Co., Buffalo; A. B. Copper, Wilkoff & Co., Youngstown, O.; and Edward Stein, United Iron & Metal Co., Canton, O.

Benjamin Schwartz, vice president, Schiavone-Bonomo Corp., New York, was presented a bronze plaque and platinum watch at the dinner, in appreciation of his ten years' service as director-general of the institute. Joseph E. Jacobson, Luria Bros. & Co., Pittsburgh, presided.

Mr. Barringer declared that the scrap industry, in a sense, is trustee for an important essential raw material of iron and steel, and the fixed point from which the industry should operate is an economic selling price to consumers. He stated that no stone would be left unturned in maintaining the good relationship between the scrap industry and the producers and consumers of scrap, and to improve the trade's position and service.

In discussing general prospects he foresaw a tendency on the part of mills, poorly located so far as consumption outlets are concerned, to fabricate more of their own products. Production of home scrap will be increased thereby.

He predicted more scrap will come from farm areas due to increasing mechanization. The South also will provide more scrap because of its industrialization, but much of this logically should move abroad, since freight rates to the northern mills militate against it. Eastern shipyards may be expected to provide a large tonnage of scrap in the next several years.

Searches Future of Scrap Trade

"What of the immediate business situation?" he asked. "If war should come, doubtless we would rather quickly move into a period of stagnation of industry based upon fear and uncertainty . . . War, undoubtedly, would speed up the socialization of industry. The Scrap institute is preparing for the contingency of war through its war service committee . . . .

"In the event radical legislation is revived in Washington, it should be recalled that the recovery of 1936-1937 matured at a time when the Supreme court and governmental reorganization bills were being actively pushed. So the threat of radical legislation ought not depress business as much as (governmental) spending will elevate it.

"Genuine recovery, of course, must ultimately be predicated upon sound governmental fiscal policies and a revival of the capital securities market, but in the meantime, we appear to be looking ahead to a year or more of generally improving business and should be encouraged by the conviction that this country is too rich in natural resources and the courage and intelligence of its people to go bankrupt."

MEETINGS

MILL SUPPLY GROUPS PLAN TRIPLE CONVENTION CRUISE

■ AMERICAN Supply and Machinery Manufacturers' association, National Supply and Machinery Distributors' association and Southern Supply and Machinery Distributors' association will conduct their 1939 triple convention May 17-23 on board the S. S. BREMEN cruising from New York to Bermuda. Convention sessions will be held morning and afternoon, May 18, 19 and 22.

The Southern association announces two zone conferences, one at the Atlanta Biltmore hotel, Atlanta, Ga., Nov. 11-12, and the second at the Washington-Youree hotel, Shreveport, La., Nov. 15-16.

BALTIMORE PURCHASERS TO STAGE THIRD EXHIBIT

Purchasing Agents' association of Baltimore will conduct its third annual manufacturers' products exhibit at the Lord Baltimore hotel, Baltimore, Oct. 25-27. Of 110 spaces, 90 per cent have been reserved.

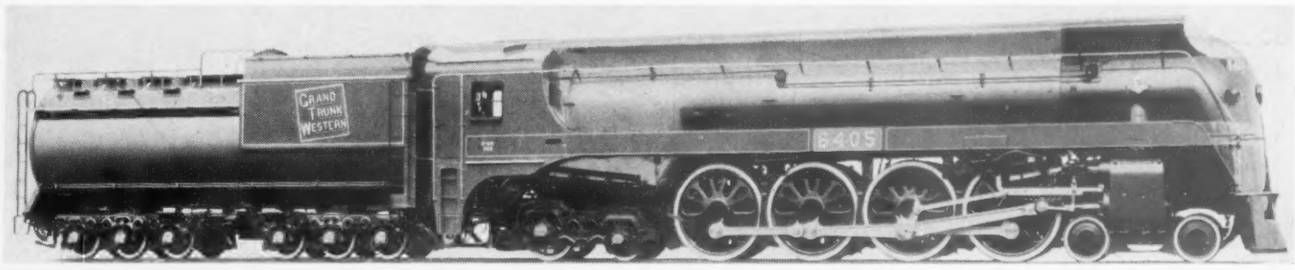
MACHINE TOOL DEALERS TO CONVENE IN CINCINNATI

Associated Machine Tool Dealers of America will conduct its annual meeting at Hotel Alms, Cincinnati, Oct. 10-11. George A. Fernley, 505 Arch street, Philadelphia, is executive secretary.

GREAT LAKES TRAFFIC MEN TO MEET IN BUFFALO

Great Lakes Regional Advisory board will hold its forty-sixth regular meeting in Hotel Statler, Buffalo, Sept. 21. In addition to reports of general and commodity committees, the program features on open forum on the transportation problem.

Use Color on New Giants of the Rails



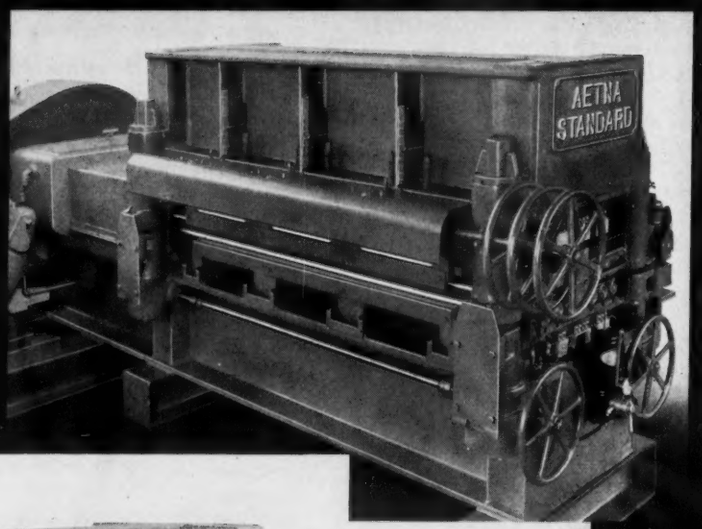
■ **Six mammoth streamlined locomotives have been built by Lima Locomotive Works Inc., Lima, O., for Grand Trunk Western, a unit of Canadian National Railways. Length, including tender, is 82 feet, 8¼ inches, weight 661,200 pounds. Tractive power is 52,500 pounds. Driving wheels, of which there are eight, are 77 inches in diameter. Cylinders are 24 inches in diameter, with 30-inch stroke. Tenders have capacity for 14,300 gallons of water and 20 tons of coal. Tender, cab and streamlined skirting along the side of the locomotive are painted green. Front of the locomotive, including smokestack and understructure are painted black, while the boiler jacket is in natural metal finish. Background of name and number "block" is red, and lettering is in gold**

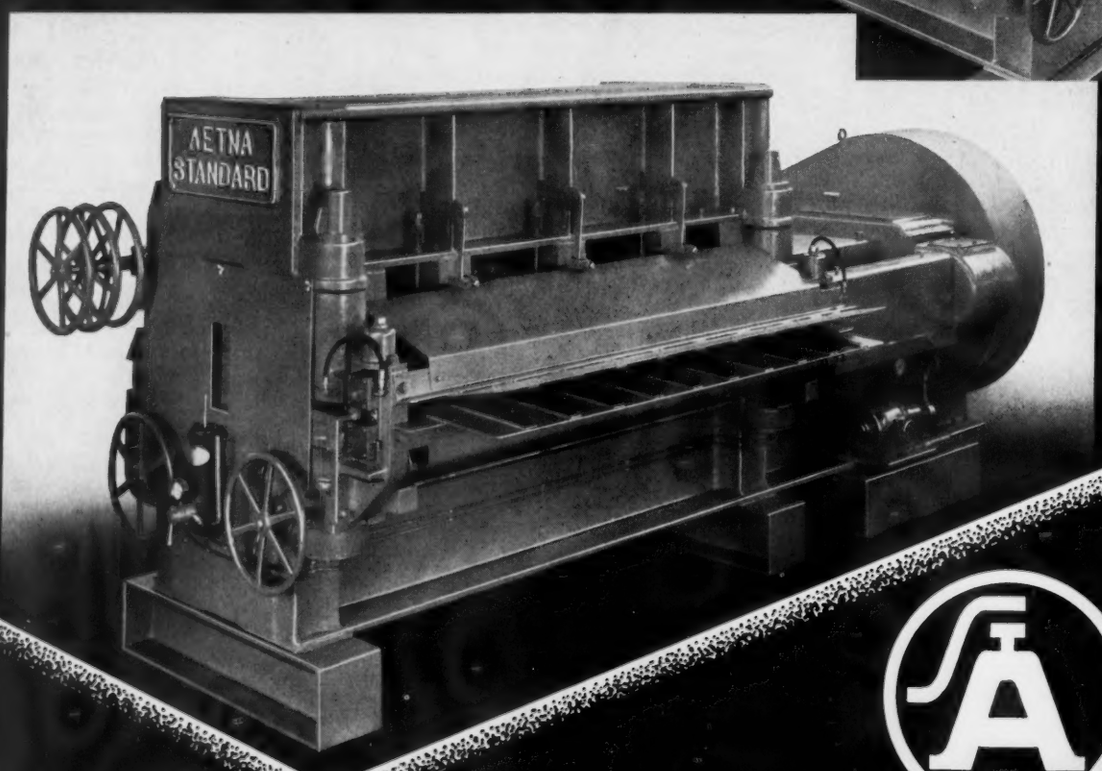
HIGHER SPEEDS—GREATER RANGE OF GAUGES—WIDER MATERIAL WITH

AETNA-STANDARD'S

ALL-WELDED BACKED-UP LEVELLER

The new Aetna Standard all-welded backed-up Leveller is designed to meet the most rigid requirements of the steel industry, and in it have been incorporated many improved details. Among these are new type couplings and spindles, a more powerful pinion and gear drive, and a unique arrangement of rollers which facilitate entering of the material.





THE **AETNA-STANDARD** ENGINEERING COMPANY

CONSULTANTS—DESIGNERS AND BUILDERS TO THE STEEL AND NON-FERROUS INDUSTRIES

YOUNGSTOWN, · OHIO, · U. S. A.

ASSOCIATED COMPANIES

Head, Wrightson & Co. Limited, Thornaby-on-Tees, England. Aktiebolaget Arboga Mekaniska Verkstad, Arboga, Sweden.

MIRRORS OF MOTORDOM

DETROIT

■ SIGNS of a slight lull in general business conditions have been detected here in the last week or two. They may represent nothing more than a temporary reaction from the enthusiasm over fall prospects which has been current, or they may evolve from a combination of war scares filtering in from Europe, plus the unsettlement which is usually felt at the time of political primaries and elections. Furthermore, there is no great concern over this easiness, since all indications point to a continuation of at least better than average automobile business this fall and winter.

Employment in automobile plants is moving upward steadily, Hudson recalling 5000 last week for the start of 1939 models, Ford holding firm at around 42,000 despite the model changeover, Chevrolet operating all subassembly departments, Pontiac working forces showing an increase as assemblies are under way, and a wide list of parts plants recalling men to work.

First labor trouble of 1939 production season broke at Briggs Mfg. Co. last Wednesday when a sitdown strike threw the plant into idleness and 9000 men out of work. Strike was the outgrowth of dismissal of union stewards after they had refused to keep up with production speed and instigated a slowdown on the gunwelding line.

Thursday noon the Plymouth plant was forced to close due to lack of bodies from Briggs and 7000 more were idle.

Meanwhile between 500 and 600 workers at the Dodge plant engaged in making Plymouth coupe bodies were laid off until such time as the Plymouth plant reopens. An equal number at the Chrysler Kercheval plant appeared likely to be affected.

Announcement of Plymouth prices has verified advance reports that reductions were in store for new models. The new list figures on Plymouth range from $645 for a standard coupe to $805 for a four-door deluxe touring sedan, and are lower than last year by as much as $15 on some body styles.

It is a safe assumption that other producers will make similar price adjustments.

Details of the new Plymouth series have been officially released, most of them having been mentioned in this department previously. Among other innovations is a new type of clutch pedal which, by means of a new "over-center" spring and variable-ratio pedal, requires less pressure the farther it is depressed. It is estimated the new clutch takes 25 per cent less foot pressure than former designs.

Centrifuse brake drums are used in combination with a new brake lining material with a 10 per cent higher coefficient of friction.

Transmission gears are of carburized Amola steel, a material which is being used to an increasing extent on parts of Chrysler Corp. cars. New coil springs also are of this type of steel.

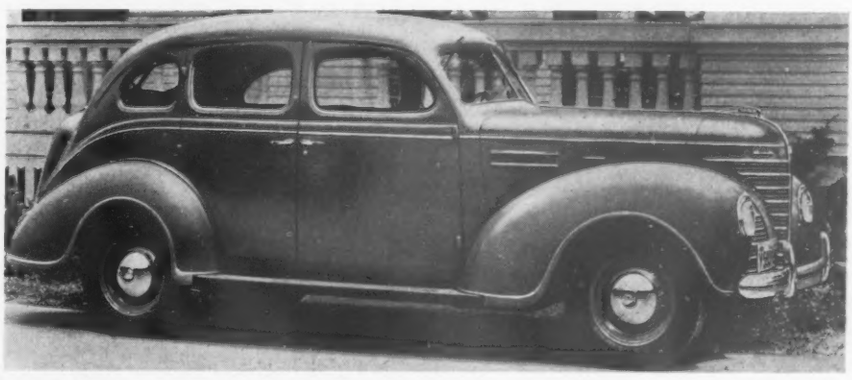
The two top or compression rings in the Plymouth engine are given the phosphate surface treatment described here a few weeks ago to eliminate initial scuffing. The top ring also is changed in shape to provide a 25 per cent increase in effective bearing surface.

■ SOME local dealers say they will be shipping new Buick models this week, but as yet there is no official

BY A. H. ALLEN
Detroit Editor, STEEL

Material appearing in this department is fully protected by copyright, and its use in any form whatsoever without permission is prohibited.

Among the First of 1939 Models



■ **Headlamps streamlined into fenders, vee-type windshield, coil springs on front wheels of Amola steel—a steel made to Chrysler specifications—remote control gearshift on steering column, and improved engine torque are among the features of this 1939 model Plymouth. The cars are now being supplied to dealers throughout the country**

information on price. One dealer here last week reported 52 orders already booked.

A new gadget worked out for use as standard equipment on the Buicks but which as yet has not been supplied on cars here for demonstration is an illuminated turn indicator, mounted on the center of the trunk compartment doors. It is controlled by actuating a small lever mounted on the gearshift arm, the latter being located on the steering column just below the wheel. A flip of this lever in one direction lights an arrow on the rear indicator, signalling a turn, either to left or right; movement of the control lever the other way illuminates an arrow pointing in the opposite direction. This new device will make four lights on the rear—right and left hand tail lights, license plate light, and turn indicator light.

Buick for 1939 also will show a new type of cherry red translucent plastic for steering wheels and dash buttons.

Plastics, by the way, are moving in on other materials strongly for use in automotive parts. Recently a company here successfully has produced a molded plastic garnish molding which may be bounced off a hard floor with no injurious effect. It is made in a single piece by injection molding at a speed of about 75 per hour, and cost is said to approximate that of a rolled steel molding.

Combine Plastics, Stainless

Another innovation in plastics is a radiator grille of combination stainless steel and molded plastic backing. Thin stainless steel strips are formed into channel section, placed in a die and plastic material molded around them in such fashion as to produce a grille section with the parallel pieces of stainless steel being set off from a plastic frame or backing. Question has been raised over the weathering properties of plastic used in exposed locations like radiator grilles, but evidently this problem has been licked.

So importantly have plastics been advancing in the automotive picture, that it is rumored some equipment scheduled for installation in the new Briggs plant to manufacture metallic moldings has been held up on the possibility these moldings might go to plastics.

■ CHANCES looked brighter last week for Graham to retain its position in the field of independent automobile builders. At the preview of the 1939 line a week ago it was revealed new financing had been arranged to wipe out working capital deficit of $1,112,000 as of July 31, and yield a new working capital of $1,188,000. A loan from the RFC has provided $750,000 cash, outstanding claims of $1,386,000 have been extended five years voluntarily, all creditors for amounts under $1000 are reported to have been paid off, and a personal loan to the company of $560,000 by Joseph B. Graham has been subordinated.

Meanwhile operating expenses have been pared sharply and a new merchandising setup worked out for 1939 models under which dealers will receive better discounts and under which the price of the new line will be reduced sharply to bring it better in line with the competition.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1936	1937	1938
Jan.	377,244	399,186	227,744
Feb.	300,810	383,900	202,872
March	438,943	519,022	238,753
April	527,625	553,231	238,133
May	480,518	540,377	210,183
June	469,368	521,153	189,399
July	451,206	456,909	150,444
7 mos.	3,045,714	3,373,778	1,456,476
Aug.	275,934	405,072	*85,000
Sept.	139,820	175,630	...
Oct.	230,049	337,979	.....
Nov.	405,799	376,629	.....
Dec.	518,958	346,886	.....
Year	4,616,274	5,015,974	.....

*Estimated.

Estimated by *Ward's Reports.*

Week ended	
Aug. 20	23,940
Aug. 27	18,700
Sept. 3	22,165
Sept. 10	17,485
Sept. 17	16,100

	Week ended Sept. 17	Sept. 10
General Motors	4,675	2,625
Chrysler	5,950	6,000
Ford	515	5,000
All others	4,960	3,860

The new Grahams will carry a base price on the standard model, with an extra charge for a so-called "supercharger package" and another extra charge for a "deluxe equipment package."

It is understood there are at present about 500 good dealer outlets for Graham, 70 per cent of them within a 500-mile radius of Detroit. Parts releases have been made for an initial lot of 1000 cars which will be turned out at once. To help absorb manufacturing overhead the Graham-Bradley line of tractors will be continued, and a new one-plow low-priced tractor introduced to supplement the present two-plow type. The new tractor will be ready for spring selling and is claimed to be the first unit in its price class to permit two-row cultivation.

Hudson has announced it will have three new cars in its lowest-price series and next year will place emphasis on chassis and body changes in the direction of safety, and a new development contributing to ride comfort. The latter may refer to coil springs on rear wheels, as there has been a widely-heard report Hudson would make this change next year.

By the end of this week, 11 manufacturers will have shown their new models to newspaper men and dealers. They are: Plymouth, DeSoto, Dodge, Chrysler, Studebaker, Graham, Oldsmobile, Nash, Packard, Buick, and Pontiac. Still to come are the previews of Chevrolet, Cadillac, Ford and Lincoln, Hudson, Hupmobile and Willys.

■ TO manufacturing plants away from the immediate Detroit area, which supply materials and parts to the automobile industry, some of the current demands made for deliveries seem almost preposterous, but to those experienced in dealing with the automobile industry they are the regular thing, especially at new model time.

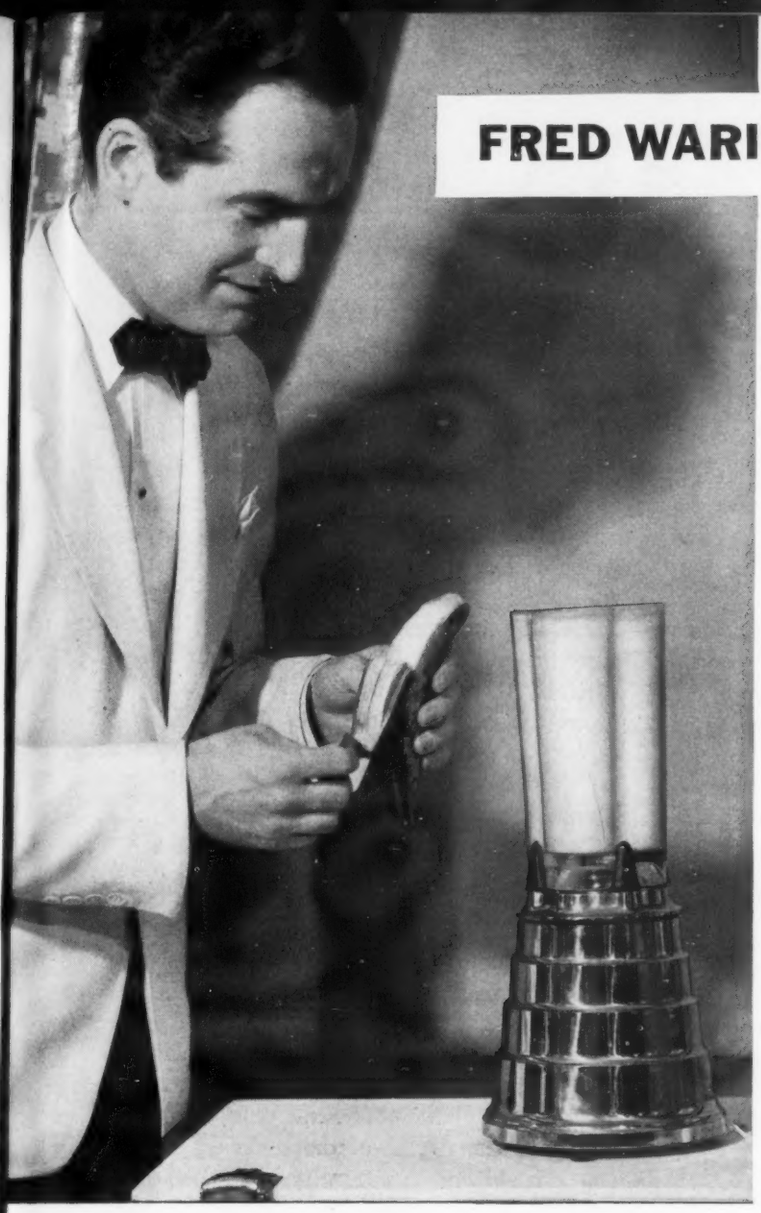
Here are a couple of examples: The Detroit representative of an eastern supplier called on a local automobile company purchasing agent and was given an order for 60,000 pieces of a certain part used on new models. Instructions on the order stated shipment was not to be made until samples were received. After receiving the order, the salesman returned to his office and within 15 minutes a "follow-up" man from the producer telephoned to ask when shipments would start, stating the parts were needed in production in two days.

Demand Quick Deliveries

When reminded of the fact samples were required, he said to forget about samples and to start shipment the next day. By a combination of teletype and fast work in the eastern plant this schedule was met.

On another occasion, as the sales representative of an eastern manufacturer emerged from the purchasing department of a body builder one afternoon with an order for 5000 pieces, he was met by another "follow-up" man who stated the material had to be available at a Detroit plant by 8 o'clock the next morning. As luck would have it, the manufacturer had some of the parts in stock and was able to make shipment by airplane that night so that the parts were at the plant in time to make the starting whistle. Incidentally, the value of these parts was $36, and the air freight charge was $42.

These two examples are not unusual, being characteristic of the rush in getting shipments to automobile builders in time to meet production schedules. It is an unsolved mystery why planning and purchasing departments are unable to anticipate requirements better.



FRED WARING!—WHAT'S HE GOT TO DO WITH A MIXING MACHINE?

Fred Waring, the well-known orchestra leader, had an idea for a new type drink mixer. He did not have the benefit of past experience in product design but neither was he hindered by tradition. He sought the latest and most efficient means of carrying out his idea—and we find that his new appliance is almost wholly composed of ZINC Alloy Die Castings.

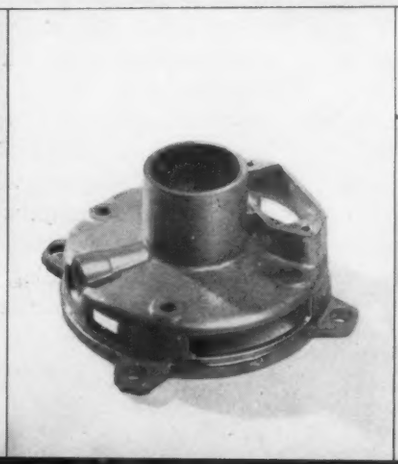
This is not merely an endorsement of the metal and method—it is another indication of the trend of the times. An examination of the four die castings, shown below, will reveal the reasoning that prompted their selection. What other production method could achieve the qualities of these die castings—at comparable cost? They possess the required weight for secure "footing"; the number of parts has been reduced to a minimum through complex design; they are satin-smooth, as cast —ready to take a durable chromium plate; and they have the exceptional physical properties characteristic of all ZINC Alloy Die Cast parts.

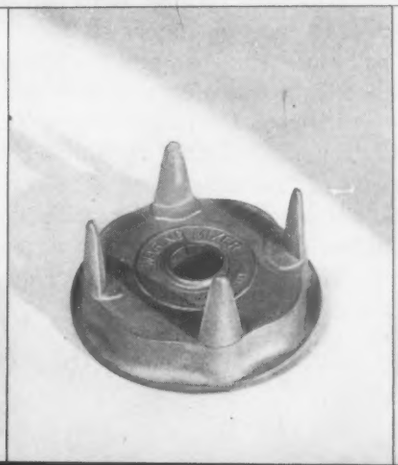
If you are in any way connected with the design, manufacture or sale of metal products you should be acquainted with this modern production method. Consult any commercial die caster—or write The New Jersey Zinc Company, 160 Front Street, New York City.

ZINC
ALLOY DIE CASTINGS

The Research was done, the Alloys were developed, and most Die Castings are specified with

HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC





EDITORIAL

Labor Trend to Independent Unions

■ A TREND that holds much portent for the future is the growing movement away from the ranks of professional labor organizations and the increasing ascendancy of independent unions.

"Dues payments into union treasuries are showing an alarming shrinkage," says R. L. McCormick in *Forbes Magazine,* in a review of the record of unionism during the depression. "Thousands of workers who have been laid off are unable to pay. Others, clinging to their jobs on a part-time basis, have soured on the organizations that were helpless to keep them steadily employed at better wages and have seized on this condition as an excuse for withdrawal. Though no official figures have been issued by the respective headquarters of the warring AFL and CIO, it is probably safe to say that a million industrial workers who once carried union cards or had signed applications for them have ceased paying dues."

Definite Swing from National Organizations Gathers Force

The flourishing state of the independent union also is attested by John J. Collins in *Nation's Business,* in citing results of a recent questionnaire. This showed that at least 700,000 workers are bargaining with their employers through independent unions, and this figure is exclusive of the hundreds of independent unions which have sought, obtained or are seeking incorporation or registration.

"A study of the 240 elections in which independent unions participated during the 26-month period ending April 1, 1938, shows that independents were victors in 125, or 52 per cent," reports Mr. Collins.

"If we break these figures down, we discover even more interesting data. In the period from Feb. 1, 1936, to Sept. 30, 1937, independent unions won only 44.8 per cent of the elections in which they participated. In the last quarter of 1937 the percentage jumped to 62.9. During the first quarter of 1938 victories climbed to 64.2."

However, says Mr. Collins, the real strength of the independent union movement is evidenced not in the elections conducted by federal and state labor boards but rather by the industries and plants in which no elections have been held. In many instances the independent unions are so firmly entrenched in the will of the employes that the outside unions do not dare to risk defeat in an election.

Workers Find Best Interests Dictate Direct Bargaining

There is much evidence to denote that the recent hysteria in labor relations has come to a definite end and that workers in increasing numbers are learning that their best interests are served by dealing directly, rather than through outside agencies, with their employers. A study of the independent union movement also reveals that this instrument of employer-employe relations springs up naturally when the policies of the employer are such as to win the respect and confidence of the employe.

The increasing importance of the independent union has great significance. So far employers have not been greatly encouraged by the many indications that the Wagner act is slated for revision, for no responsible spokesman so far has indicated a desire for revision of a kind that would give the employer rights under the act. The growing desire among the workers themselves for direct dealing with their employers, however, cannot indefinitely be ignored by national and state legislators.

In that event the revision of the Wagner act is a question which will be answered ultimately by the only solution possible—namely, a law which will guarantee the application of the principles of democracy in industrial relations. In the meantime, the best course for the employer is one of fair and honest dealings with employes. No employer who recognizes the mutuality of interest between himself and his employes and who acts accordingly has much to fear of the future in labor relations.

THE BUSINESS TREND

Activity Index Reflects Holiday Interruption

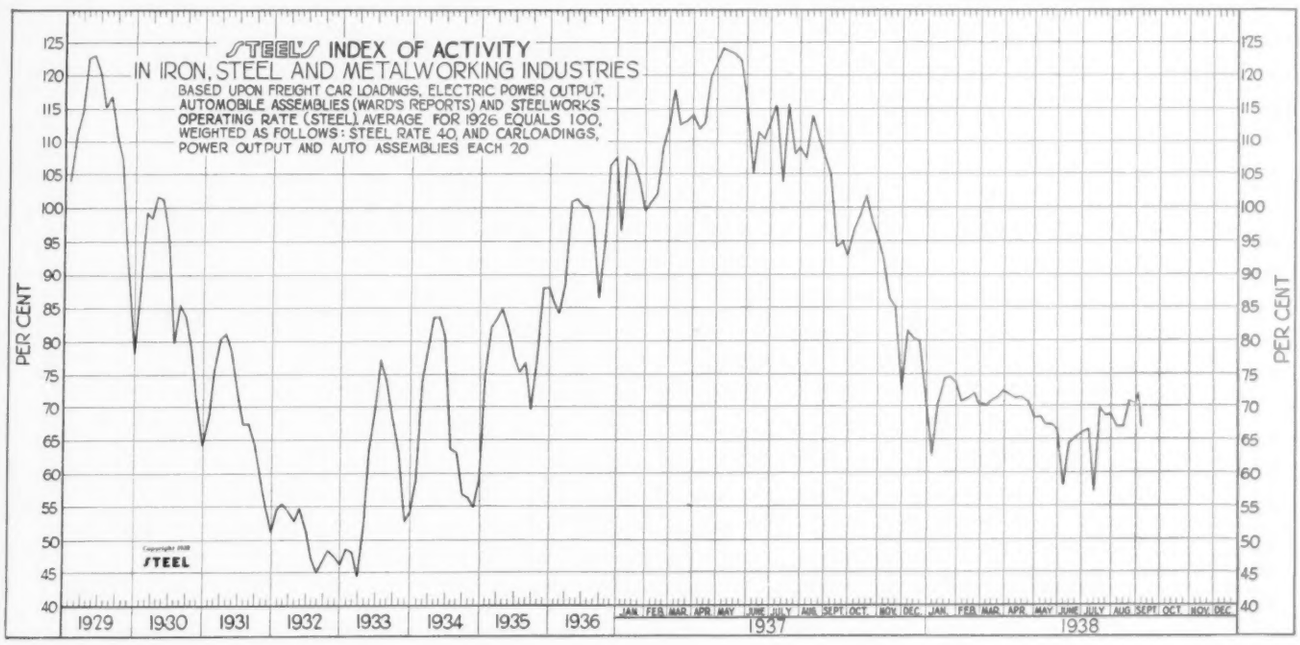
■ INDUSTRIAL activity suffered a temporary reaction in the week ended Sept. 10 from the upswing registered in the preceding weeks. This was due primarily to the interruption occasioned by the observance of Labor day. As a result STEEL's index of activity in the iron, steel and metalworking industries declined 5.4 points to 66.9 per cent, thereby losing all the ground gained since the week ended Aug. 13.

It is encouraging to note that the recent decline in STEEL's index of 5.4 points was substantially less than the loss of 8.4 points during Memorial day week and was also less than the drop of 9.4 points recorded in the holiday week ended July 9. A year ago the index receded 10.5 points to 94.3 per cent in the week including Labor day.

The current decline in the index reflects substantial losses in all four barometers from which the index is composed. Steelmaking operations eased 3.0 points to 41.5 per cent, due entirely to the holiday interruption as indicated by the early estimates for the week ended Sept. 17, which place the steel rate at approximately 45.0 per cent. The rate of steelworks operations during the Labor day week last year was 72.0 per cent; in 1936, 69.5 per cent; in 1935, 54.0 per cent; and in 1934, 18.0 per cent.

Electric power consumption of 2,048,360,000 kilowatt-hours during the week ended Sept. 10, constitutes a substantial decline from the preceding week and represents the lowest weekly power output since July 9. An early estimate of revenue freight car loadings for the holiday week represents a decline of approximately 72,000 cars from the peak this year of 648,039 cars recorded in the preceding week. A year ago railroad freight traffic declined 93,334 cars to 711,299 cars during Labor day week. Increased industrial activity and movement of large crops through the fall months should bolster the freight traffic to substantially above the 650,000 cars- per-week level.

Reflecting the completion of 1938 model assemblies by one large independent producer and also the holiday interruption, automobile output declined to 17,485 units in the week ended Sept. 10. This compares with 22,165 cars in the preceding week and 59,017 in the compara-



STEEL'S index of activity declined 5.4 points to 66.9 per cent in the week ended Sept. 10:

Week ending	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
June 4	58.1	105.1	98.8	79.3	75.7	65.3	51.0	73.5	97.9	119.8
June 11	64.4	111.4	99.4	80.0	82.3	69.9	51.1	73.2	96.2	120.1
June 18	65.2	110.3	101.0	77.3	83.6	72.1	51.8	70.9	95.0	120.1
June 25	66.0	112.8	101.9	78.4	81.8	73.9	51.6	70.6	94.0	120.0
July 2	66.5	115.3	97.5	64.1	79.4	77.0	49.2	64.1	75.0	107.8
July 9	57.1	103.8	100.9	76.5	52.3	71.4	41.7	69.4	86.9	116.8
July 16	69.9	115.7	99.9	79.8	67.8	79.1	46.9	70.0	79.1	115.5
July 23	68.7	108.0	102.1	80.8	68.1	79.4	51.5	69.7	78.7	120.8
July 30	69.0	109.1	102.5	78.4	66.4	78.8	46.1	68.9	79.2	117.3
Aug. 6	66.9	107.3	98.7	73.4	64.6	75.9	45.1	67.0	85.6	117.2
Aug. 13	66.9	113.8	92.6	77.5	64.6	74.7	44.6	67.4	86.2	116.8
Aug. 20	70.5	110.3	97.7	77.0	61.4	74.2	44.9	67.3	88.5	116.4
Aug. 27	70.3	108.5	94.0	77.3	60.3	71.6	45.2	66.5	87.4	116.9
Sept. 3	72.3	104.8	87.5	70.9	55.1	70.3	45.4	65.3	79.0	106.3
Sept. 10	66.9*	94.3	83.1	70.1	53.5	65.5	44.9	60.9	85.9	114.0

*Preliminary.

tive week of 1937. A moderate increase in output for the week ended Sept. 17 is predicted, with those producers now in operation on 1939 models gradually stepping up production schedules. While no official production figures have yet been released for the month of August, it is generally conceded to be the ebb month of the year.

To what extent the general uncertainties abroad will hinder the normal seasonal tendencies, which are now on the side of an expansion in business volume, remains to be demonstrated. With Labor day now passed it will take but another week or two before it will be evident whether or not the anticipated fall uptrend is developing.

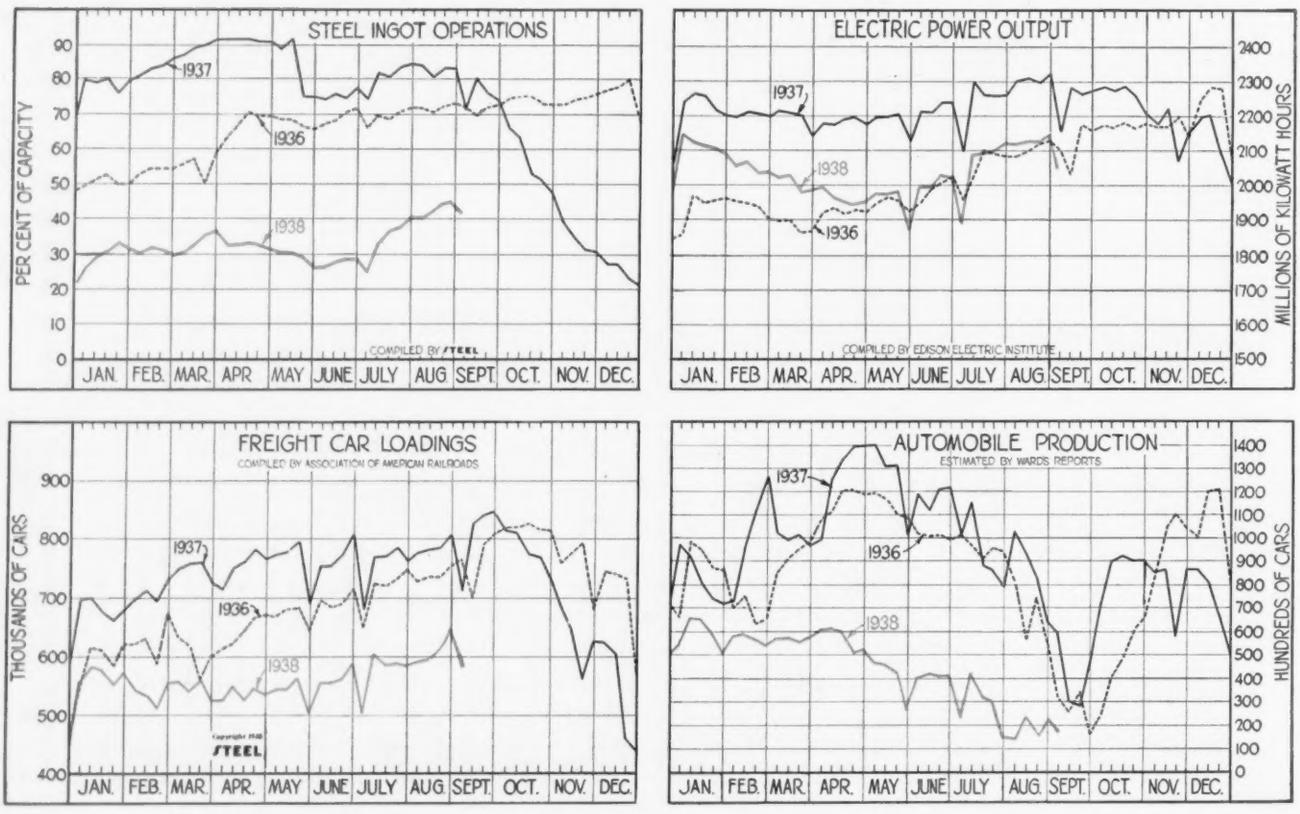
COMMODITY PRICE INDEX ADVANCES

The all commodity wholesale price index of the United States Department of Labor recorded the second consecutive monthly gain during July. This showing is in sharp contrast to the general trend for the first five months this year, when the index declined from 81.7 to 78.1 per cent of the 1926 average. The index for the month of July was placed at 78.8 per cent, an increase of 0.5 points over June, and represents the highest level since March of this year when it stood at 79.7 per cent. However, largely because of a decrease in the wholesale price of farm products during August, early estimates for the month place the U. S. Bureau of labor index at 77.9 per cent, a decrease of 0.9 points from the July level.

U. S. STEEL SHIPMENTS UP SHARPLY

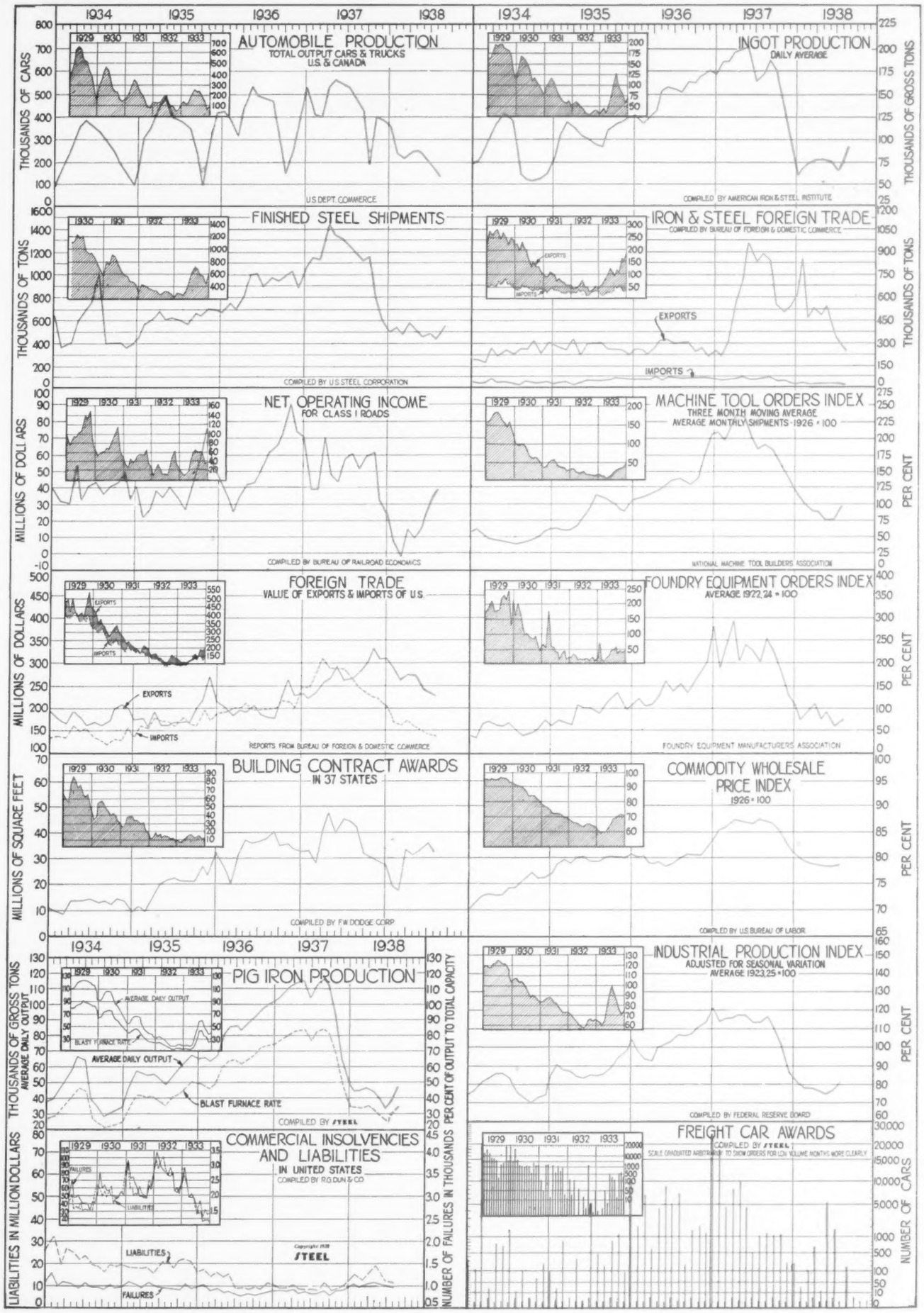
Monthly finished steel shipments by the U. S. Steel Corp. during August registered the sharpest month-to-month rise since March, 1937. Shipments in August amounted to 558,634 tons, a gain of 117,064 tons over the July total of 441,570, but remained well below the 1,107,858 tons shipped in August, 1937.

Shipments for the month were estimated at approximately 35.5 per cent of capacity, while steel ingot operations were placed at 33.5 per cent. Average shipping rate during July was estimated at 30.3 per cent, against an ingot rate of 29.5 per cent. For the first eight months this year total finished steel shipments aggregated 4,010,558 tons or less than half the 9,908,884 tons shipped in the comparable period last year.



Week ending	Steelworks Operating Rate Per Cent 1938	1937	1936	Electric Power Output Million KWH 1938	1937	1936	Freight Car Loadings 1938	1937	1936	Weekly Auto Output 1938	1937	1936
June 4	25.5	75.0	67.0	1,878	2,131	1,945	502,624	692,140	695,845	26,980	101,629	101,896
June 11	25.5	74.0	68.0	1,991	2,214	1,989	553,854	754,360	686,812	40,175	118,798	100,415
June 18	27.0	75.5	70.5	1,991	2,213	2,005	555,569	756,289	690,716	41,790	111,620	100,733
June 25	28.0	74.0	71.5	2,019	2,238	2,029	558,937	773,733	713,639	40,918	121,032	99,695
July 2	28.0	77.5	66.0	2,014	2,238	1,956	588,864	806,168	649,759	40,945	122,890	100,697
July 9	24.0	74.0	69.5	1,881	2,096	2,029	501,013	682,205	724,324	25,375	100,981	97,833
July 16	32.0	82.0	68.5	2,084	2,298	2,099	602,300	770,075	720,402	42,010	115,380	91,317
July 23	36.0	81.0	70.5	2,084	2,258	2,088	580,882	770,980	731,062	32,070	88,055	96,863
July 30	37.0	84.0	71.5	2,093	2,256	2,079	588,703	782,660	747,551	30,390	86,448	95,970
Aug. 6	40.0	84.5	71.5	2,115	2,261	2,079	584,050	769,706	728,293	14,771	78,736	81,804
Aug. 13	40.0	84.0	70.5	2,133	2,300	2,093	589,561	777,382	736,497	13,790	103,250	56,679
Aug. 20	41.5	81.0	72.0	2,138	2,304	2,125	597,918	781,247	734,973	23,940	93,339	73,709
Aug. 27	43.5	83.0	73.0	2,134	2,294	2,135	620,511	787,373	753,742	18,700	83,310	53,937
Sept. 3	44.5	83.0	71.5	2,148	2,320	2,098	648,039†	804,633	764,680	22,165	64,200	31,628
Sept. 10	41.5	72.0	69.5	2.048	2.154	2.028	576,402*	711,299	699,859	17,485	59,017	26,750

*Preliminary. †Revised.


1934 1935 1936 1937 1938
AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS U.S. & CANADA
THOUSANDS OF CARS
U.S. DEPT. COMMERCE
INGOT PRODUCTION
DAILY AVERAGE
THOUSANDS OF GROSS TONS
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
FINISHED STEEL SHIPMENTS
THOUSANDS OF TONS
COMPILED BY U.S. STEEL CORPORATION
IRON & STEEL FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
NET OPERATING INCOME
FOR CLASS I ROADS
MILLIONS OF DOLLARS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MACHINE TOOL ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS 1926 = 100
PER CENT
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
MILLIONS OF DOLLARS
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
FOUNDRY EQUIPMENT ORDERS INDEX
AVERAGE 1922-24 = 100
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
BUILDING CONTRACT AWARDS
IN 37 STATES
MILLIONS OF SQUARE FEET
COMPILED BY F.W. DODGE CORP.
COMMODITY WHOLESALE PRICE INDEX
1926 = 100
COMPILED BY U.S. BUREAU OF LABOR
PIG IRON PRODUCTION
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
THOUSANDS OF GROSS TONS
PER CENT OF OUTPUT TO TOTAL CAPACITY
COMPILED BY STEEL
INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923-25 = 100
COMPILED BY FEDERAL RESERVE BOARD
COMMERCIAL INSOLVENCIES AND LIABILITIES
IN UNITED STATES
COMPILED BY R.G. DUN & CO.
LIABILITIES IN MILLION DOLLARS
NUMBER OF FAILURES IN THOUSANDS
Copyright 1938 STEEL
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW VOLUME MONTHS MORE CLEARLY
NUMBER OF CARS

Electric Furnace Design

Curves and data afford simplified design system as all figures are reduced to electrical units. Total-furnace-loss curves also provide a valuable shortcut

By **ROLLAND R. LAPELLE**

Continental Industrial Engineers Inc.
Chicago

■ A BRIEF summary of methods of calculation and design of electric furnaces operating within the temperature ranged 450 to 2100 degrees Fahr. is presented here in a convenient form. Certain of this data is available in standard works on furnace design by Mawhinney, Trinks, Stansel and others but is not given in electrical units most convenient for electric furnace work. Other data are the result of numerous tests on electric furnaces under actual operating conditions.

Selection of type of furnace most suitable for work to be done is an exceedingly important decision. Proper selection of furnace type determines ultimate success of the entire operation. No amount of pains taken in the detailed design itself will redeem a wrong selection at this point. While this is a matter beyond the scope of this paper, some of the factors influencing a choice will be pointed out.

First consideration is to decide whether furnace is to be of batch, semicontinuous, or continuous type. In general, batch-type furnaces are cheaper in first cost than continuous furnaces, often occupy less floor space, and may or may not require less operating labor, depending upon whether or not the product handled is such that automatic charging and discharging operations are possible. As a rule they use more electrical energy per unit of output and do not yield as uniform a result. They may, if carefully designed, produce as uniform a temperature throughout the charging area as a continuous furnace, but usually the heat does not reach all parts of the charge at the same time. As a result, some parts of the charge are at temperature for a longer time than others; hence differences in grain size, hardness or other physical properties may result.

More Flexible

Batch-type furnaces are more flexible and may be operated at widely differing time and temperature cycles on successive charges, whereas a continuous furnace can be changed in temperature only slowly and at a loss in production while the change is being made. Continuous furnaces, on the other hand, may have progressive zoning, and higher rates of heat liberation may be employed in early zones without danger of overheating than are permissible in the final zones, resulting in faster heating than is possible in a btach-type furnace.

Certain operations are best carried out in the semicontinuous type in which work is placed in the hot furnace as fast as the preceding charge is removed—as in car or elevator type furnaces—or where furnace is placed, hot, over a succession of stationary bases and charges as in bell and shuttle furnaces. These types combine the advantages

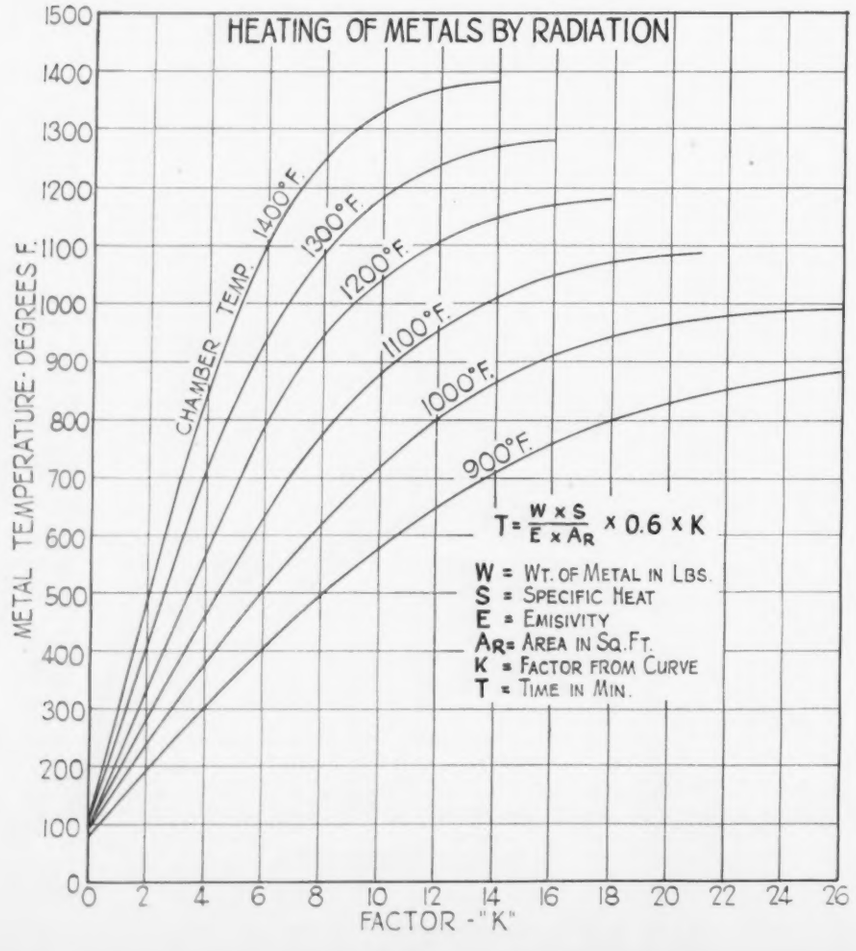


Fig. 1—Values of factor K used in calculating time to heat a metal

of a certain amount of labor saving in work handling with flexibility of the batch-type furnace and, in addition, make full use of heat stored in furnace linings, although a cold car or base must of course be heated.

Assuming a continuous type furnace has been chosen, numerous types of handling mechanisms remain to be considered. M. H. Mawhinney in *Industrial Heating* recently illustrated some of the almost numberless types of conveyors developed to transport work through heating chambers. A consideration of various types cannot be undertaken here but due weight must be given to the type of material being handled, its susceptibility to damage while hot, cost of conveyor system, and probable heat losses to be expected from use of the particular type of conveyor decided upon.

Also to be considered are expected maintenance costs inherent in various types of conveyors and methods of placing the material upon and removing it from the conveyor.

Heating Rates

Furnace heating rates are considered next. Having selected a suitable furnace type and a conveyor if necessary, it is next necessary to determine the effective furnace heating chamber dimensions.

Furnace heating rate is determined usually in one of three ways. Each should be checked. Rules of thumb developed by experience for the calculation of furnace capacity may be summarized as follows:

A.—Heating Rate in Steel for Good Temperature Equalization within the Material.

Plain Carbon Steel—
Flat Section: ⅛ inch in 5 minutes.
Round Section: 1 inch of diameter in 20 minutes.

High Carbon and Alloy Steels—
10 to 25 per cent additional time required.

B.—Heating Rate Based on Type of Furnace.

(To avoid excessive furnace maintenance, or very poor temperature distribution).

Normalizing sheet or strip in roller hearth; 40 to 45 pounds per square foot hearth area per hour.

Heat treating in conveyor type furnaces: 35 to 40 pounds per square foot per hour.

Drawing in conveyor type furnaces without forced circulation at 450 to 1000 degrees Fahr.: 15 to 25 pounds per square foot per hour.

Annealing brass or copper sheets, rods, tubes, coiled sheet or strip, etc.: 45 to 55 pounds per square foot per hour.

Small parts or exceedingly light sections such as stampings, etc. can only be loaded very lightly on the hearth; therefore, above ratings usually cannot be obtained on these classes of work. Above ratings apply only for heating in furnaces by natural radiation and convection and do NOT apply where forced convection is used. Forced convection systems, of course, operate to increase considerably the production possible at the lower temperature ranges. Their effect decreases rapidly as temperature increases beyond 1000 to 1200 degrees Fahr.

C.—Heating Rates Based on Ability to Liberate Heat from Electric Elements.

Nickel-chromium heating elements of either the cast or rolled types can be driven at heat-treating temperatures at a rate sufficient to liberate approximately 2 to 2½ kilowatts per square foot of wall, roof or bottom covered. This amounts to from 8 to 14 watts per square inch of element radiating area. Ten can be considered an average value. This value, of course, depends upon rate at which the heating elements may be driven and still have a satisfactory life expectancy which in turn depends upon operating temperature of furnace. For this reason, above rates may be exceeded somewhat at lower operating temperatures and must be decreased somewhat at the highest temperatures.

In calculating furnace size, recourse should be had to all of the above methods of calculation, the lowest rating being the controlling factor. Limiting factor frequently is Case C. Productive capacity is more often limited by inability of the heating elements to liberate more heat than by inability of the work to absorb it. Certain types of hardening furnaces require lengthy soaking periods which then become the determining factor.

In the case of large bulky parts actual physical dimensions of the work may determine furnace dimensions. Above methods then may be used to determine actual productive capacity of the furnace when desired.

In continuously heating certain relatively light material such as sheet, strip, wire in strands or small tubes, it is possible to increase production above that normally obtainable by operating the furnace with what is known as a "temperature gradient." This presupposes that excess electrical capacity exists but is not being used. Light products do not as a rule absorb heat as rapidly as the heating elements are capable of supplying it. By operating the first zone or zones of a continuous furnace at a temperature higher than that permissible in the work, the latter can be caused to absorb heat at a rate faster than normal. By removing work before it reaches chamber temperature—discharging on a rising temperature—heating time may be used to regulate final work temperature.

Used For Wire and Strip

This is the method employed in many furnaces for annealing wire and strip in strands. Where a soak is desired, the final zone of a continuous furnace may be operated at desired finishing and soaking temperature and work permitted to soak for a time determined by length of the zone still obtaining rapid heating in earlier zones.

This method can only be used where work is thin and without any large changes in section. It is be-

Table I

Emissivity Factor "E" For Various Materials
E = 1.00 for black body at any temperature.

Radiating Surface	Author	Temp. in Deg. Fahr.	Factor E
Aluminum oxidized	S	752	0.113
Aluminum oxidized	S	1,112	0.192
Brass oxidized	S	1,112	0.58
Brass cast dead polished	P	100	0.11
Brass bright polished	P	100	0.07
Brass as rolled, clean	Calc.	1,200	0.45
Brick, fireclay	N	752	0.79
Cast iron, oxidized	S	1,112	0.77
Cast iron, bright	M	100	0.22
Cast iron, polished	L	122	0.17
Copper, oxidized	S	752	0.568
Copper, oxidized	S	1,112	0.568
Copper, polished	L	122	0.03
Copper, polished	L	1,832	0.09
Copper, as rolled or drawn	Calc.	1,050	0.50
Enamel, ground coat	Calc.	1,550	0.70
Enamel, cover coat	Calc.	1,450	0.45
Lead, oxidized	S	392	0.631
Lead, molten	C	Average	0.55
Nickel, oxidized	L	932	0.48
Nickel, oxidized	L	1,300	0.62
Steel, oxidized	S	1,112	0.787
Steel, polished	K	100	0.17
Steel, as cold rolled	Calc.	1,700	0.45
Tin, bright	L	122	0.04
Zinc, bright	L	122	0.04
Zinc, dull	H	100	0.21
Zinc, oxidized	S	752	0.11

Sources of above values
C—Electrical Heating Vol. 1—J. C. Woodson.
E—Mechanical Engineers Handbook.
H—"Hutte" Engineers Handbook.
K—Kents Engineers Handbook
L—Library of Iron and Steel, Vol. 6.
M—Metallurgists and Chemist's Handbook.
N—National Metals Handbook.
P—Penders Handbook, 2nd Edition.
S—Smithsonian Physical Tables, 7th Edition.
Calc.—Values calculated from actual practice in existing furnace installations.

ing employed in a number of sheet, wire and strip furnaces.

Calculating heating time involves the following formula and curves in Figs. 1, 2 and 3. Table No. 1 gives emissivity values for commonly encountered materials and also a few values obtained by calculation from known results in actual furnace installations. These experimental values may or may not be true emissivity values for materials given but their use has given good results in practice.

$$T = 0.6\ WSK/A_R E$$

(Same as formula in Fig. 1.)

where W is weight of material in pounds; S is specific heat of material; E is emissivity of material; A_R is area of material receiving radiant heat, in square feet; T is heating time in minutes; K is factor from curve, depending on temperature gradient.

As an example, suppose it is desired to determine the time required to heat 20-gage cold-rolled sheet steel, weighing 1.5 pounds per square foot to a temperature of 1750 degrees Fahr. in a chamber uniformly heated to 1800 degrees Fahr. Then W is 1.5; S is 0.16; E is 0.45; A_R is 2.0; K is 6.5 (from curve No. 2). This gives: T = 1.5 x 0.16 x 0.6 x 6.5/[0.45 x = 1.04 minutes.

This assumes entire chamber is uniformly heated, seldom the case due to door losses at charging end. It is usual practice to add 50 per cent to the calculated time, except in annealing wire or other light material. As noted previously, speed of heating permissible in the material usually exceeds capacity of the electric heating elements, thus automatically increasing heating time to that determined by the latter figure. Nevertheless, in many cases the above calculation permits a more intelligent furnace design and a more satisfactory use of full capacity of electric heating elements. Soaking time, if required, must be added to the figure obtained above.

Ratio Width to Length

Relation of width to length now is found. Having determined hearth area, a consideration of parts being treated, available floor space, etc., usually fixes the desired width to be used. Determination of required length follows. In setting up ratio of length to width where product being handled and available floor space allows some flexibility, several points should be kept in mind.

Length should be sufficient for at least two control zones if at all possible. A zone to be effective should be at least 3 and preferably 5 feet in length.

Width should be great enough for economical loading of largest parts to be handled.

Width should be narrow enough to prevent excessive stress in cross beams, rolls or other supporting members if these are necessary for the particular type of conveyor or carrier selected.

Excessive lengths on pusher or chain-conveyor-type furnaces should be avoided, due to difficulties in material buckling or excessive stresses in the conveyor with subsequent excessive maintenance and early failure.

For many medium sized furnaces, a ratio of length to width equal to 4 is suitable. For larger furnaces, this ratio may be as high as 7 or 8 to 1 without undue difficulties or excessive radiation losses. Each case must be considered individually on the basis of ability to push the material or stresses in conveying equipment. Other things being equal, a wide short furnace usually is lower in first cost than a long narrow one and also is usually more economical to operate due to lower radiation losses—unless the end losses, due to frequently or continuously open doors, are unusually high.

Having determined dimensions of furnace, it is now necessary to determine the various losses in the furnace structure. These losses may be listed as follows: Radiation losses, door losses, atmosphere losses.

Radiation Losses

"Radiation losses" as used in furnace work means all types of steady or standby losses. This includes conductivity through walls, losses around doors when in normally closed position, losses through and around thermocouples, heat fuses, rollers, shafts, pusher rods or other mechanical parts projecting through furnace walls, etc. The word "radiation" in this sense is of course technically incorrect as many of

Fig. 2—Values of factor K for lower chamber temperatures than in Fig. 1

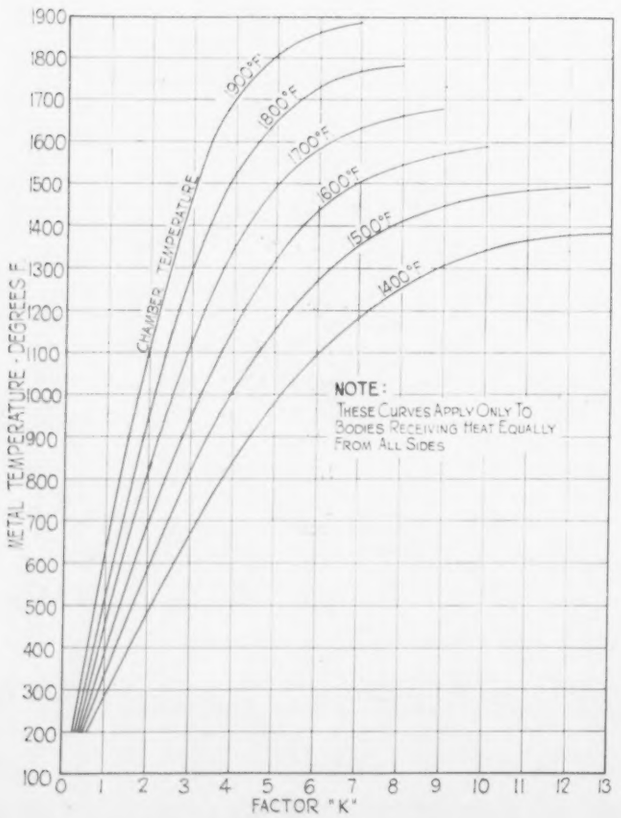
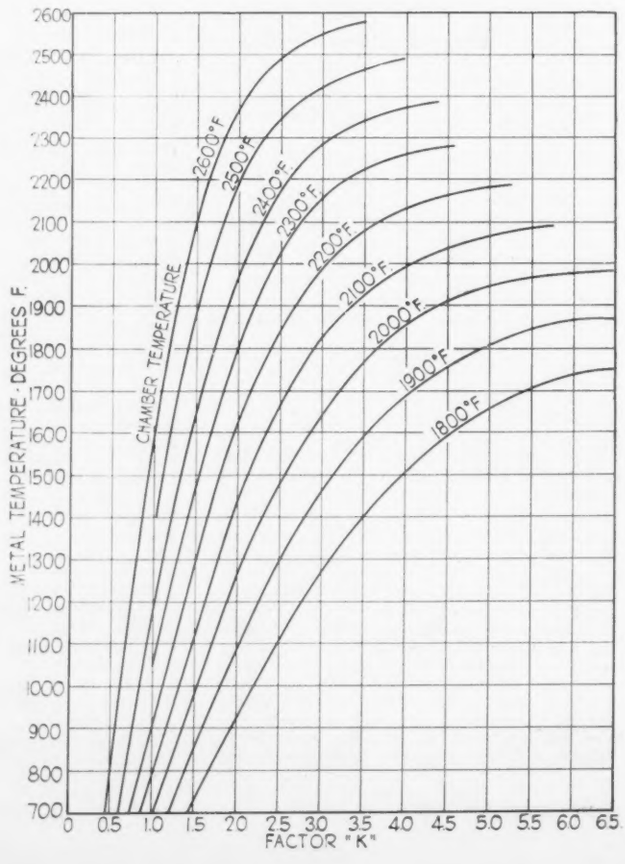


Fig. 3—Factor K values for higher metal temperatures than curves in Figs. 1 and 2



HERE'S THE PLACE TO INCREASE YOUR INGOT YIELD UP TO 4%

A thin layer of Liquitol spread over the molten metal in these ingots will reduce and control piping so effectively that croppage will be reduced up to 50%.

A 3 to 4 per cent increase in yield means from 200 to 400 more pounds of usable metal . . . easily the profit on an ingot of steel.

Liquitol, an exothermic powder, capable of holding metal in a liquid state in a mold for sufficient time to permit control and reduction of piping. It changes the physical and chemical properties of the metal in no way.

Piping controlled in this manner is reduced so effectively that croppage amounts to only about 50% of normal croppage. That means a net saving of up to 4 per cent of usable metal.

Complete information will be furnished on request. May we work with your metallurgist and open hearth superintendent to get additional yield from your ingots? No obligation.

AND FOR FOUNDRY OPERATORS

Liquitol can reduce your casting spoilage, and labor costs and give you sounder castings. Ask our engineers for information on Liquitol in the foundry.

Grades of LIQUITOL

LIQUITOL A:—*for small cross section, ingots of carbon and alloy steels.*

LIQUITOL B:—*for cast iron (On mixtures containing over 50% steel we recommend Liquitol A).*

LIQUITOL C:—*for straight carbon steel, ingots of large cross section, carbon and alloy steel.*

LIQUITOL A SPECIAL:—*for tool steel.*

The ALPHA-LUX COMPANY *Inc.*

192 Front Street . . . . . NEW YORK CITY

PLANTS: PHILADELPHIA, PA. CICERO, ILL.

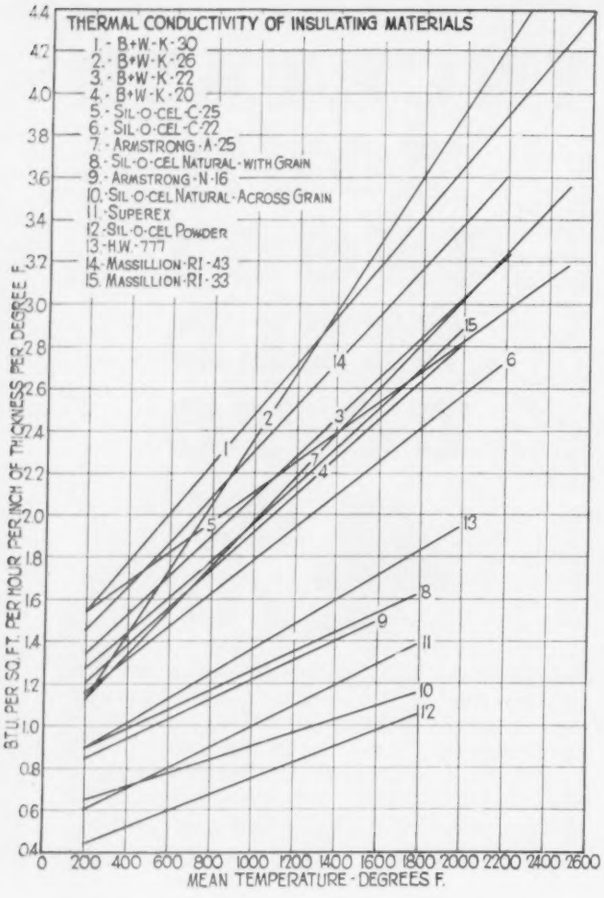

THERMAL CONDUCTIVITY OF INSULATING MATERIALS
1 - B+W-K-30
2 - B+W-K-26
3 - B+W-K-22
4 - B+W-K-20
5 - SIL-O-CEL-C-25
6 - SIL-O-CEL-C-22
7 - ARMSTRONG-A-25
8 - SIL-O-CEL NATURAL - WITH GRAIN
9 - ARMSTRONG-N-16
10 - SIL-O-CEL NATURAL - ACROSS GRAIN
11 - SUPEREX
12 - SIL-O-CEL POWDER
13 - H.W.-777
14 - MASSILLION-RI-43
15 - MASSILLION-RI-33
BTU PER SQ FT PER HOUR PER INCH OF THICKNESS PER DEGREE F.
MEAN TEMPERATURE - DEGREES F.

Fig. 4—Thermal conductivity of insulating materials at various temperatures

these losses occur by conduction or convection and not by radiation at all. Nevertheless, the term is so generally used as to have acquired a connotative meaning, and will be used as defined above in this paper.

Most important are the losses through refractories and insulating materials forming furnace walls, bottom, top and ends. These losses may be calculated accurately by the formula for R above.

This formula gives thermal resistance, R, of the composite wall as built up of various refractory and insulating materials. Thermal conductivities of a number of commonly used insulating, insulating-refractory and refractory materials are given in curves Figs. 4 and 5.

$$R = \frac{1}{\frac{2d_1 \times A_0}{K_1 (A + A_2)} + \frac{2\,d_2 \times A_1}{K_2 (A_2 + A_3)} + \frac{2\,d_3 \times A_2}{K_3 (A_3 + A_4)} + \cdots + \frac{2\,dn \times A_n}{K_n (A_{n-1} + A_0)}}$$

where,

K_1, K_2 K_3, etc. = Thermal conductivities of wall materials, in B.t.u.s per square foot per hour per degree Fahr. per inch of thickness.

d_1, d_2, d_3, etc. = Thickness of wall section of conductivity K_1, etc., in inches.

A_1 = Inside area in square feet.
A_0 = Outside area in square feet.
A_2, A_3, etc. = Areas of intermediate sections, in square feet.

Since conductivity varies according to temperatures, it is necessary to know approximate mean temperature of materials before the equation can be evaluated. These mean temperatures may be determined by dividing the supposed temperature drop through entire wall among the various layers in approximate proportion to their thicknesses and their conductivities. It should be emphasized that not the interface temperatures of the various layers, but their MEAN temperatures determine their conductivities.

Having assumed a temperature, and determined a preliminary value for the thermal resistance, R, reference now is made to curves Figs. 6 and 7 which give loss in kilowatts per square foot of outside shell area resulting from various inside temperatures and various values of R. These curves also give outside shell temperatures corresponding to various loss values.

To determine the loss accurately, it now is necessary to recheck the assumed interface temperature used in determining thermal conductivities of the various layers. With an approximate knowledge of outside shell temperature, it is a simple matter to recheck thermal conductivities of the refractory and insulating materials involved, redetermine R, and then secure an accurate figure for the total thermal losses involved.

Losses obtained above do not, unfortunately, represent all the losses to be expected. It has been found by actual test that conductivity losses through the furnace walls represent only from 50 to 60 per cent of total furnace losses. Methods of computing other losses are not, in general, so well defined as methods of computing pure wall losses. It has been found, however, that certain approximations hold reasonably well.

1. **Thermocouple and heat fuse**

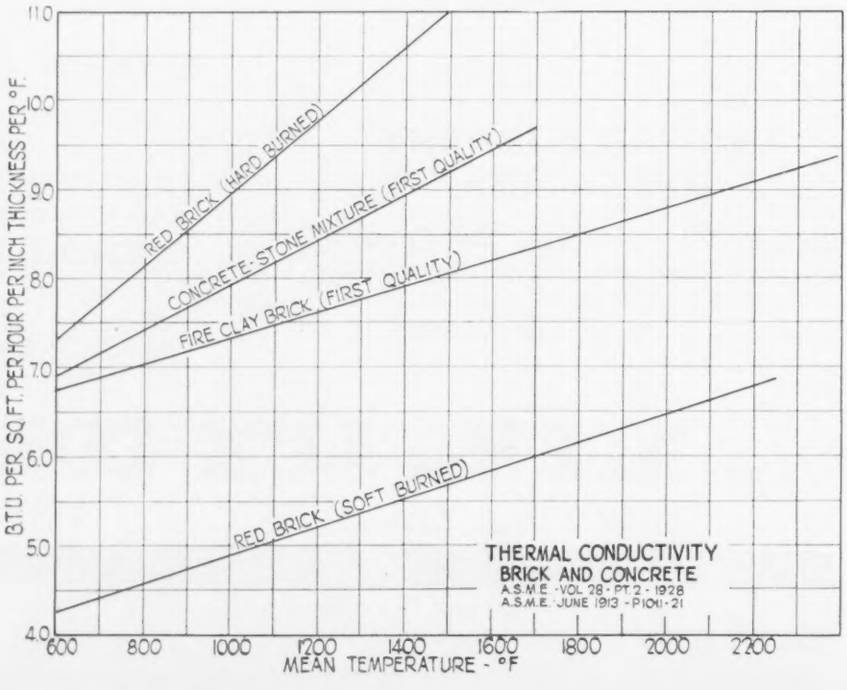

RED BRICK (HARD BURNED)
CONCRETE-STONE MIXTURE (FIRST QUALITY)
FIRE CLAY BRICK (FIRST QUALITY)
RED BRICK (SOFT BURNED)
THERMAL CONDUCTIVITY
BRICK AND CONCRETE
A.S.M.E. - VOL. 28 - PT. 2 - 1928
A.S.M.E. JUNE 1913 - P1041-21
B.T.U. PER SQ. FT. PER HOUR PER INCH THICKNESS PER °F.
MEAN TEMPERATURE - °F

Fig. 5—Values of thermal conductivity for brick and concrete at various temperatures

COLD FINISHED BAR

STEELS

PACEMAKERS OF PRODUCTION

Machining character—as developed in B & L Cold Finished Bar Steels—will enable you to set a new pace in production of cut-from-the-bar parts.

You will appreciate the importance of quality manufacture when you run B & L Screw Stock on your automatics. It machines to a smooth bright finish—is easy on the tools—permits faster feeds and speeds—and by producing more pieces per hour, it lowers the unit cost.

There is a B & L grade for your every requirement—Free Cutting Bessemers—Lead Bearing Screw Steel, both Open Hearth and Bessemer Grades—Plain Carbon and Alloy Grades of steels—in all standard sections. You can profit from the economies that go with B & L Quality Steels.

COLD DRAWN BARS
GROUND SHAFTING
ULTRA-CUT STEEL
EXTRA WIDE FLATS
SPECIAL SECTIONS
ALLOY STEELS

BLISS & LAUGHLIN, INC.

HARVEY, ILL. *Sales Offices in all Principal Cities* BUFFALO, N.Y.

CONTINUOUS PRODUCTION Pays BIGGER DIVIDENDS

Get the Facts on Allis-Chalmers "Lo-Maintenance" Motors! Learn How They Beat Production Losses . . . Keep Machines in Service . . . Pay for Themselves in the Savings that Continuous Production Brings!

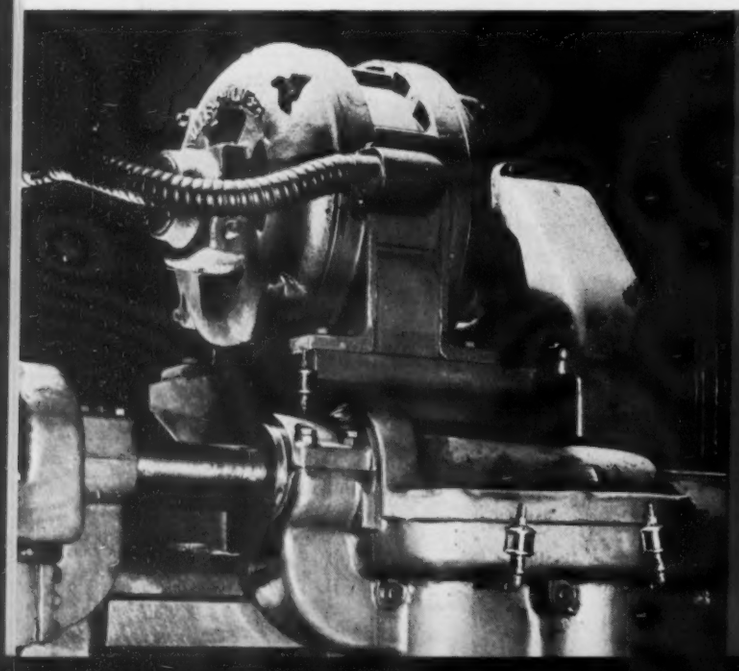
On a cost-per-year basis, plant owners all over the country have found that Allis-Chalmers "Lo-Maintenance" Motors pay bigger dividends! And it's easy to understand why!

"Lo-Maintenance" Motors are built to give years of continuous, trouble-free operation!

And the machines they run stay on the job . . . no time-wasting, money-wasting shut-downs!

That's how you get continuous production! And continuous production pays bigger dividends! Actually, you get more than just an ordinary motor when you specify Allis-Chalmers. You get a motor designed and built to meet the most rigid engineering requirements. That's why you get a motor that will stand up on the toughest jobs . . . stay on the job year after year, under the severest service demands.

Near you, in an Allis-Chalmers district office, is an engineer, whose job is to key motors to your production demands. Find out how you can get continuous production with Allis-Chalmers "Lo-Maintenance" Motors. Find out how you can get bigger dividends! Call him . . . today!



Driving a milling machine on a production line is this 40 hp motor. It's been in continuous service since 1929—*nine years* of dependable economical operation! It takes sturdy design and construction, both electrical and mechanical, to meet service conditions like this!

ELECTRICAL DIVISION

ALLIS-CHALMERS

MILWAUKEE · WISCONSIN

MOTORS FOR ALL APPLICATIONS FROM ½ HP AND UP

Electric Fork Trucks Are Used to Upend Coils

■ AT ONE of the large steel mills producing 200,000 gross tons of tin plate per year, four large gasoline-electric fork trucks furnish an efficient means of handling coils in process.

Material first goes through continuous pickler to remove all scale from the strip. Then after passing through the cold mills, strip enters an electrolytic cleaner which removes the oil film remaining as strip

Fig. 1—Coils roll down ramp from electrolytic cleaner onto forks of truck as shown here. Photos courtesy Yale & Towne Mfg. Co., Philadelphia

comes from the cold mill. Coils roll down a ramp from the cleaner as shown in Fig. 1 onto the forks of one of the big trucks.

The fork truck tilts, elevates and revolves the huge coil from a horizontal to a vertical position as shown in Fig. 2 and carries it to scales for weighing. From there, the truck places the coil on flat cars or conveyor lines going to the annealing ovens, Fig. 3. The four trucks for service between the electrolytic cleaner and annealing ovens here will handle 14,000-pound loads. Each truck is equipped with five adjustable forks 40 inches long; three are on the bottom and two on the side. They will handle coils up to 54 inches in diameter. In this installation, they replace the combination of permanent upender and ram truck as they perform all the required operations in elevating, tilting, upending and transporting of the coils.

Trucks have a 76-inch wheelbase and are articulated; that is, the frame is split transversely and the halves joined by a large shaft or bolt so front and rear sections can oscillate about this shaft. This permits a caterpillar motion and allows all four wheels to remain on the ground when passing over irregularities. Also it removes torsional strains from the frame.

These trucks are provided with the Yale Cam-o-tactor, a mechanically operated contactor controller for the drive motor. Upending is accomplished by a large bull gear and pinion which turns the carriage and coil through 90 degrees. Trucks are powered with 60-volt batteries or engine-driven generator units.

Fig. 2—Coil is upended while truck is on way to scales (at left)

Fig. 3—Coil is finally placed flat on conveyor going to annealing ovens

Another feature is the electric steering system. Turning the steering lever closes a follow switch which immediately opens requiring the operator to keep following along with the steering handle in order to have the truck turn in a complete circle. With this arrangement the position of the steering wheels is indicated at any instant by the position of the steering lever without necessitating the operator's peering over the side to look at the wheels.

Cast Steel Developed for Low Temperature Service

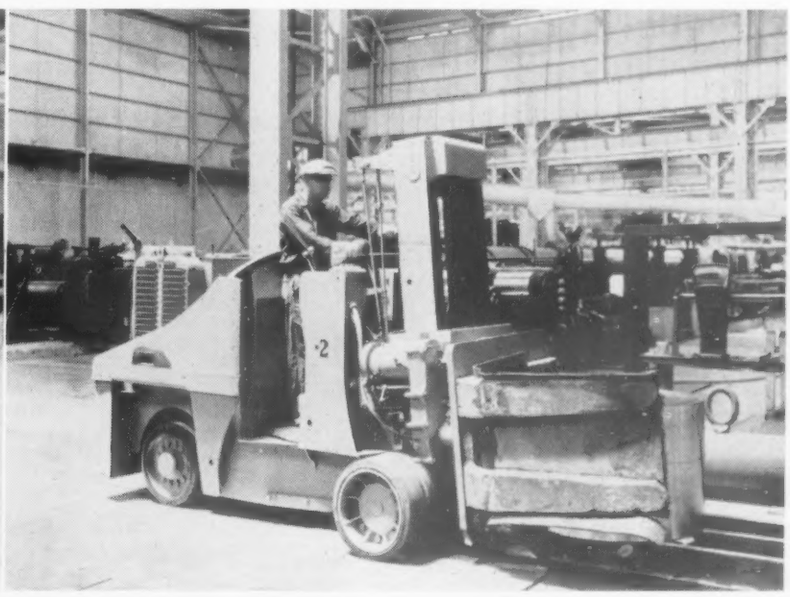
■ Difficulty of obtaining a cast steel that will meet impact requirements at exceedingly low temperatures has been met by Merco Nordstrom Valve Co., Oakland, Calif., which has developed a special cast molybdenum steel that meets any low temperature specifications that have been set so far, it is claimed.

This steel is used for valve bodies. Its application in a plant for manufacture of ethyl chloride, where temperatures are as low as 150 degrees below zero, Fahr., is a typical example.

Welds High Tensile Steel

■ A new electrode for welding pressure vessels of high tensile steel has been developed by Lincoln Electric Co., Cleveland, and is designated as Fleetweld No. 9 HT.

This electrode is suitable for welding deep-groove joints and produces welds having a tensile strength of 70,000-76,000 pounds per square inch. Special features include low spatter loss, high deposition rate, easily removable slag formation, well-shaped beads and weld deposits having minimum porosity.



Complete List of Awards In Welding Competition

(*Continued from Page 24*)

third, $305.26, Dale D. Douglass, plant engineer, Chevrolet Gear & Axle division, General Motors Corp., Detroit; fourth, $203.51, Harry H. Hooker, assistant to chief engineer, Eaton Mfg. Co., Cleveland; fifth, $152.63, Carl W. Floss, Detroit.

Automotive Sub-Class A-4: Trailers

Second, $508.77, Arnold Meyer, mechanical engineer, Heil Co., Milwaukee; third, $305.26, Carl L. Halpin, factory superintendent, Fruehauf Trailer Co., Detroit; fourth, $203.51, Ray F. Kuns, president, Trotwood Trailers Inc., Trotwood, O.; fifth, $152.63, Ray Harroun, development engineer, Saginaw Stamp & Tool Co., Saginaw, Mich.

Classification B: Aircraft

Second, $2543.88, Nepoti Agostino, Genova, Italy; third, $1322.82, Ralph H. Upson, consulting engineer, Kay Products Co., Detroit; fourth, $1017.56, James W. Fitch and John Czarniecki Jr., engineers, Kenworth Motor Truck Corp., Seattle.

Aircraft Sub-Class B-1: Engines

First, $712.28, John Pavlecka, Detroit; second, $508.77, George W. Kirkendall, Taylor-Young Airplane Co., Alliance, O.

Aircraft Sub-Class B-2: Fuselages

Fifth, $152.63, C. R. de Laubenfels, research engineer, Lockheed Aircraft Corp., Los Angeles.

Classification C: Railroads

First, $3764.94, Frederick Mills, chief draftsman, Western Australian Government railways, Australia; second, $2543.88, John H. Hruska, metallurgical engineer, Electro-Motive Corp., La Grange, Ill.; third, $1322.82, Ralph H. Redline, welding supervisor, American Locomotive Co., Dunkirk, N. Y.; fourth, $1526.33, Clyde B. Faverdy, chief engineer, Ryan Car Co., Chicago.

Railroad Sub-Class C-1: Locomotives

Fourth, $203.51, George S. Edmonds, superintendent of motive power, Delaware & Hudson railroad, Albany, N. Y.

Railroad Sub-Class C-2: Freight Cars

Second, $508.77, Edgar Brooker, metallurgist, U. S. Navy, Arlington, Va. and Fred A. Boyer, inspector, Atchison, Topeka and Santa Fe railroad, Topeka, Kans.; third, $305.26, Ralph J. Dion, arc welder, Bloedel Stewart & Welch Ltd., Bloedel, Canada; fourth, $203.51, O. M. Ebell, G. F. Atwood and Samuel Couzin, Couzin & Atwood Engineers, Johannesburg, South Africa; fifth, $152.63, John E. Muhlfeld, consulting engineer, Kansas City Southern railroad, New York.

Railroad Sub-Class C-3: Passenger Cars

First, $712.28, J. D. Watson, engineer, Madras & Southern Mahratta railway, Madras, India; second, $508.77, A. E. Katz, welding engineer, National Steel Car Corp., Hamilton, Ont.

Railroad Sub-Class C-4: Locomotive and Car Parts

First, $712.28, W. C. Rockenstire, assistant superintendent, American Locomotive Co., Schenectady, N. Y.; second, $508.77, H. C. Venter, superintendent shops, Southern Pacific railroad, Sacramento, Calif.; third, $305.26, M. A. Burke, general foreman locomotive tender shop, Lima Locomotive Corp., Lima, O.; fourth, $203.51, William Simons, superintendent shops, Cliffs-Dow Chemical Co., Marquette, Mich.; fifth, $152.63, Ralph S. Twogood, assistant engineer, Southern Pacific railway, Berkeley, Calif.

Classification D: Watercraft

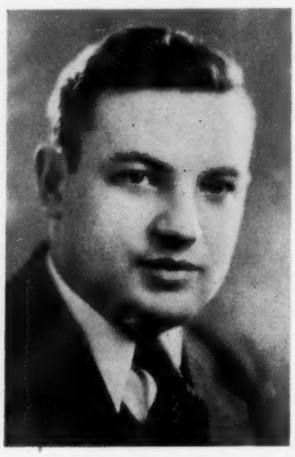
First, $3764.94, Dr. P. Schoenmaker, chief metallurgist and construction engineer, Smit-Transformer Works, Nijmegen, Holland, and Ir. G. deRooy, chief construction department, Royal Dutch navy; second, $2543.88, J. T. Dalcher, consulting engineer, New York; third, $1322.82; Stanley A. Midnight, structural designer, hull department, American Shipbuilding Co., Cleveland; fourth $1017.56, Robert H. Macy, hull technical department, Newport News Shipbuilding & Dry Dock Co., Newport News, Va.

Watercraft Sub-Class D-1: Commercial Vessels

Fifth, $152.63, M. L. Sellers, production staff, Newport News Shipbuilding & Dry Dock Co., Newport News, Va.

Watercraft Sub-Class D-2: Pleasure Craft

First, $712.28, Milo Bailey, president, Bailey Steel Ship Building Co., Detroit; second, $508.77, J. Murray Watts, naval architect, Philadelphia; third, $305.26, Elliott Gardner, naval architect, Hyde Boat Yard, Scotia, N. Y.; fourth, $203.51, Edwin B. Wheeler, shipbuilding manager, Electric Boat Co., Groton, Conn.;



John Mikulak

Awarded $3764.94 for his paper "Proposed Design for a Vertical Synchronous Motor or Alternating Current Generator"

fifth, $152.63, John C. White, proprietor, John C. White Welding & Machine Works, Neepawn, Manitoba.

Classification E: Structural

Second, $2747.39, Robert V. Proctor, general manager and chief engineer, Commercial Shearing & Stamping Co., Youngstown, O.; third, $1526.33, Howard E. Boath, senior engineer, and Charles MacNish, engineer of structural design, corps of engineering, U. S. army, St. Louis; fourth, $1526.33, Robert S. Treat and John F. Willis, bridge designers, Connecticut state highway department, Hartford, Conn.

Structural Sub-Class E-1: Buildings

Second, $508.77, J. G. Tsagaris, welding engineer, Erie Steel Construction Co., Erie, Pa.; third, $305.26, Gilbert H. Atwood, chief draftsman, Dravo Corp., Pittsburgh; fourth, $203.51, R. Sherman, consulting engineer, Messrs. Steel Ceilings Ltd., Middlesex, England; fifth, $152.63, W. Cory Hale, designing structural engineer, Roy A. Benjamin, architect, Jacksonville, Fla.

Structural Sub-Class E-2: Bridges

Second, $508.77, B. M. Shimkin and G. A. Sedgwick, designing engineers, bridge department, Sacramento, Calif.; third, $305.26, Stanley G. Reiff, design engineer, General Construction Co., Omaha, Neb.; fourth, $203.51, Thomas H. Gardner, structural engineer, Florida East Coast railway, St. Augustine, Fla.; fifth, $152.63, John M. Heffelfinger, bridge engineer, and H. T. Borton, assistant bridge engineer, City of Cleveland, Cleveland.

Structural Sub-Class E-3: Houses

First, $712.28, S. Fraser McIntosh, vice president, Insulated Steelbilt Structures Inc., Amsterdam, N. Y.; second, $508.77, Myron T. Hill, architect, Toledo, O.; third, $305.26, Waldron Faulkner, architect, Washington; fourth, $203.51, E. W. Burgess, engineer, Milwaukee; fifth, $152.63, E. H. McClintock, inventor and designer, Springfield, Mass., and T. K. O'Connor, Haarmann Steel Co., Holyoke, Mass.

Structural Sub-Class E-4: Miscellaneous Structures

Third, $305.26, Cyril Helsby, consulting engineer, Brighton Marine & Palace Pier Co., London; fourth, $203.51, Robert B. Allen, engineer, Truscon Steel Co., Dallas, Tex.; fifth, $152.63, D. B. Hunt, welding engineer, Southern railway, Atlanta, Ga.

Classification F: Furniture and Fixtures

First, $3764.94, E. J. Freeman, associate professor, Clemson college, Clemson, S. C.; second, $2543.88, Paul J. Birkmeyer, New York; third, $1729.84, Clinton Bolin, draftsman, Lloyd Mfg. Co., Menominee, Mich.; fourth, $1119.31, Richard E. Drover III, Austin Co., Chicago.

Furniture and Fixtures Sub-Class F-1: House Furniture

Second, $508.77, W. J. Atkinson Jr., superintendent, and E. H. Atkinson, assistant superintendent, Fulton Metal Bed Mfg. Co., Atlanta, Ga.; third, $305.26, Harold C. Whitehouse, architect, Spokane, Wash.; fourth, $203.51, Henry P. Print, senior partner, Print Bros., Oxon, England; fifth, $152.63, F. E. Steele, Shreveport, La.

Furniture and Fixtures Sub-Class F-2: Office Furniture

Fourth, $203.51, Mary Musgrave, teacher, Junior high school, Ft. Worth, Tex.; fifth, $152.63, E. Christie, welding instructor, Army Vocational Training Centre, Hants, England.

Classification G: Commercial Welding

First, $3764.94, Howard McCord, foreman, and Fred H. Drews, consultant, W. G. Jarrell Machine Co., Charlotte, N. C.; second, $2543.88, James M. Pool, owner, Louisville Welding Works, Louisville, Ky.; third, $1322.82, George P. Harber, owner, Harber Engineering Works, Albany, Oreg.; fourth, $1526.33, E. W. Weinberger, owner, Weinberger Garage, Mott, N. D.

Commercial Welding Sub-Class G-1: Job Shops

Fourth, $203.51, Fred Cook, London, O.; fifth, $152.63, L. E. Duff, manager, Angell & Williams Ltd., London.

Commercial Welding Sub-Class G-2: Garages

Second, $508.77, Charles N. Weston, Weston Garage & Repair Shop, Phillipsburg, Kans.; third, $305.26, Clarence McClellan, director of welding, McClellan & Sons, Menomonie, Wis.

Classification H: Containers

First, $3764.94, Arnold A. Seipel, hydraulic and mechanical engineer, bureau of reclamation, Denver; second, $2543.88, G. M. Stearns, district production engineer, Cities Service Oil Co., Russell, Kans.; third, $1729.84, Thomas S. Gaylord, supervisor of welding, Eastman Kodak Co., Rochester, N. Y.; fourth, $1322.82, Edward F. Spanner, managing director, Messrs. Spanner Thimble Tube Boilers Ltd., London.

Containers Sub-Class H-1: Contents Stationary

Third, $305.26, Robert G. Milligan, supervising engineer, Ocean Accident & Guarantee Corp., Ltd., New York; fourth, $203.51, Odd Jacobsen, naval

NOW 4 NEW G-E WELDING ELECTRODES

ALL-POSITION TYPES

W-20E, for general welding. Use a-c or straight polarity direct current

W-22E, for U-68 welding. Use reverse-polarity direct current

FLAT-POSITION TYPES

W-23E for multipass butt welds with U-groove preparation. Use alternating current or reverse-polarity direct current

W-24, for flat and horizontal fillets; also for butt welds. Excellent finish. Use alternating current or direct current

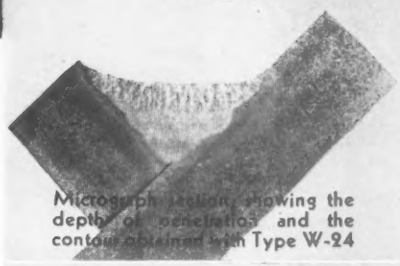
Get Better Welds at No Additional Cost

EXCELLENT PENETRATION WITHOUT UNDERCUTTING OR OVERLAPPING

HERE are four new G-E welding electrodes that operators say are the best they've ever used. In terms of profits, the new ease of handling they provide means increased fabrication returns because operators can turn out better welds at higher speeds.

One reason why operators prefer these new electrodes is because the arc has no flare and they can get better penetration without undercutting, pile up, or overlapping. Slag does not get into the crater, hence they don't have to fight against slag inclusions. And you don't have to baby these rods! Use high currents on them, kick them around—the coating can take it. Using them in moist atmospheres around shipyards and similar places does not injure them. Heated store rooms, vacuum packing, etc. are unnecessary.

But to prove that this isn't too good to be true, you'll need samples. They can be obtained free from your nearest G-E arc-welding distributor or sales office or by sending the coupon to General Electric Company, Schenectady, N. Y.



Micrograph section, showing the depth of penetration and the contour obtained with Type W-24

Sample multipass fillet made with Type W-24, showing the excellent appearance of the weld

GENERAL ELECTRIC

General Electric, Schenectady, N. Y.
Dept. 6E-201

Please send me samples of your new welding electrodes.

NAME .....

FIRM .....

STREET .....

CITY ..... STATE 150-56

architect and chief welding engineer, Trosvik Verksted A/S, Brevik, Norway; fifth, $152.63, Wilber W. Rodgers, quartermaster, U. S. Engineers, Memphis, Tenn.

Containers Sub-Class H-2: Contents Moving

Third, $305.26, Howard Weiss, engineer, Dingle-Clark Co., Cleveland; fourth, $203.51, Alfred E. Bratfisch, charge hydraulic design, hydro power plants, City of Los Angeles, Los Angeles; fifth, $152.63, Howard G. Kornberg, shop superintendent, Fargo Foundry Co., Fargo, N. D.

Classification I: Welderies

Second, $2747.39, H. Thomasson, welding engineer, Canadian Westinghouse Co. Ltd., Hamilton, Ont.; third, $1526.33, Paul H. Setzler, production manager, Lukenweld Inc., Coatesville, Pa.; fourth, $1322.82, A. H. Davison, engineer, U. S. Engineers Office, Providence, R. I.

Welderies Sub-Class I-1: Commercial Weldery

Third, $305.26, R. W. Sternke, production manager, Lakeside Bridge & Steel Co., Milwaukee; fourth, $203.51, W. Hoens, chief engineer, and W. J. Reinhard, former draftsman, Taylor-Winfield Corp., Detroit; fifth, $152.63, Charles H. Hughes, New Dorp, N. Y.

Welderies Sub-Class I-2: Plant Weldery

Third, $305.26, Vladimir L. Maleev, professor and consulting engineer, Stillwater, Okla.; fourth, $203.51, John W. Westfall, East Longmeadow, Mass.; fifth, $152.63, W. V. Faerman, welding engineer, Chantier de Penhoet, St. Nazaire, France.

Classification J: Functional Machinery

First, $3664.94, John Mikulak, mechanical engineer, Electric Machinery Mfg. Co., Minneapolis; second, $2747.39, Herbert Stone, assistant works manager, Markham & Co. Ltd., Chesterfield, England; third, $1526.33, L. M. Davis, hydraulic test engineer, Pennsylvania Water & Power Co., Baltimore, and J. M. Mousson, hydraulic test engineer, Safe Harbor Water Power Corp., Baltimore; fourth, $1526.33, John N. Anderson, designing engineer, Otis Elevator Co., New York.

Functional Machinery Sub-Class J-1: Metal Cutting

First, $712.28, John Thomson, works director, Sir William Arrol & Co. Ltd., Glasgow, Scotland; second, $508.77, Harold Verson, chief engineer, Verson All Steel Press Co., Chicago; third, $305.26, Arthur Kershaw, electrical and welding engineer, Messrs. Butler Machine Tool Co. Ltd., Victoria Iron Works, Halifax; fourth, $203.51, Leighton A. Wilkie, president, Continental Machine Specialties Co., Minneapolis; fifth, $152.63, Archer B. Jones, assistant foreman, welding department, Jeffrey Mfg. Co., Columbus, O.

Functional Machinery Sub-Class J-2: Metal Forming

First, $712.28, John M. Baxter, chief mechanical engineer, Sir William Arrol & Co. Ltd., Dalmarnock Iron Works, Glasgow, Scotland; second, $508.77, Harry L. Schultz, draftsman, Cleveland Punch & Shear Works Co., Cleveland; third, $305.26, M. Earl Lohr, planning engineer, Bethlehem Steel Co., Johnstown, Pa.; fourth, $203.51, Walter E. Klauberg, plant engineer, Wyatt Metal & Boiler Works, Houston, Tex.; fifth, $152.63, G. A. Backman, assistant sales engineer, Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

Functional Machinery Sub-Class J-3: Electrical

Second, $508.77, Messrs. Herry and Metauer, Nancy, France; third, $305.26, Lloyd Haines, switchboard draftsman, I-T-E Circuit Breaker Co., Philadelphia; fourth, $203.51, H. B. Sherer, electrical engineer, Imperial Electric Co., Akron, O.

Functional Machinery Sub-Class J-4: Prime Movers

Third, $305.26, Mayson W. Torbet, Great Kills, N. Y.; fourth, $203.51, L. H. Parker, electrical engineer, and F. C. Stagg, welder, Turlock Irrigation District, Turlock, Calif.; fifth, $152.63, Harry F. Gauss, professor of mechanical engineering, University of Idaho, Moscow, Idaho.

Functional Machinery Sub-Class J-5: Conveying

Second, $508.77, R. Debuire, Nord, France; third, $305.26, George E. Roberts, designer, General Railway Signal Co., Rochester, N. Y.; fourth, $203.51, C. L. Mason, draftsman, I. Matheson & Co. Ltd., New Glasgow, N. S.; fifth, $152.63, C. B. Curtiss, engineer and proprietor, Bay City Foundry & Machine Co., Bay City, Mich.

Functional Machinery Sub-Class J-6: Pumps and Compressors

First, $712.28, Charles Beensen, Cocoa, Fla.; second, $508.77, G. H. Thayer, mechanical engineer, Port of Portland, Portland, Oreg.; third, $305.26, Fred F. Burya, Portland, Oreg.; fourth, $203.51, E. R. Fox, welding shop foreman, U. S. Engineers, Memphis, Tenn.; fifth, $152.63, W. H. Whittall, chief tool and plant designer, and Frank N. Buxton, assistant tool and plant designer, Henry Simon Ltd., Stockport, England.

Marvin Whitlok

Awarded $7326.46 jointly with L. J. Carey for their paper "Welded Aircraft Piping"

Functional Machinery Sub-Class J-7: Business Machinery

First, $712.28, L. F. Mitchell, chief engineer, F. E. Curtis, engineer, and C. J. Hueber, engineer, Addressograph-Multigraph Corp., Euclid, O.

Functional Machinery Sub-Class J-8: Not Otherwise Classified

First, $712.28, C. H. Willits, sales manager and chief engineer, Mitts & Merrill, Saginaw, Mich.; second, $508.77, Hale D. Seymour, Monsanto Chemical Co., St. Louis, Mo.; third, $305.26, R. A. Griffin, A. E. Goodwin Pty. Ltd., Lidcomb, Australia; fourth, $203.51, Carl R. Jack, assistant mechanical engineer, U. S. Engineers, Los Angeles; fifth $152.63, Maxwell H. Hill, designing engineer, Bausch & Lomb Optical Co., Rochester, N. Y.

Functional Machinery Sub-Class J-9: Jigs and Fixtures

First, $712.28, James T. Lewis Jr., assistant works manager, Cleveland Crane & Engineering Co., Cleveland; second, $508.77, T. C. Mellon, Worthington Pump & Machinery Corp., Buffalo; third, $305.26, A. S. Curry, methods supervisor, Nash Engineering Co., South Norwalk, Conn.; fourth, $203.51, A. W. Bjorkman, Otis Elevator Co., Yonkers, N. Y.; fifth, $152.63, George L. Kluter, tool supervisor, Warner & Swasey Co., Cleveland.

Functional Machinery Sub-Class J-10: Machine Parts

First, $712.28, Herbert A. Silven, machine designer, Norton Co., Worcester, Mass.; second, $508.77, E. R. Greer, engineer, Rotary Snow Plow Co., Minneapolis; third, $305.26, P. W. Martin, chief engineer, Smalley General Co., Bay City, Mich.; fourth, $203.51, L. J. Berkeley, president, Berkeley Engineering Co., Cleveland; fifth, $152.63, Fred O. Volz, vice president and sales engineer, Lakeside Bridge & Steel Co., Milwaukee.

Classification K: Industry Machinery

Second, $2747.39, J. O. Bishop, master mechanic and welding supervisor, National Supply Co., Torrance, Calif.; third, $1526.33, Edmund G. Grant, associate mechanical engineer, California Institute of Technology, Pasadena, Calif.; fourth, $1526.33, R. F. Bergmann, chief engineer, Rayon Machinery Corp., Cleveland, and A. F. MacDonald, designing engineer, American Bridge Co., Pittsburgh.

Industry Machinery Sub-Class K-1: Processing

First, $712.28, George E. Dexter, salesman and engineer, Puget Sound Sheet Metal Works, Seattle; second, $508.77, Eugene A. Balsey and Charles A. Schneider, engineers, Link-Belt Co., Chicago; third, $305.26, Richard W. Stanley, design engineer, Merritt Engineering & Sales Co., Lockport, N. Y.; fourth, $203.51, V. Schmiedeknecht, Louisville, Ky.; fifth, $152.63, A. H. Vaughan, chief engineer, and J. R. Moore, engineer, Electric Furnace Co., Salem, O.

Industry Machinery Sub-Class K-2: Construction Machinery

First, $712.28, A. G. Ruthrauff, draftsman, crane and shovel development branch, Link-Belt Co., Chicago; second, $508.77, Robert C. Shoemaker, engineer in charge of equipment, Warren Northwest Inc., Portland, Oreg.; third, $305.26, R. A. Zeilman, assistant chief engineer, Thew Shovel Co., Lorain, O.; fourth, $203.51, Reinhard H. Bergmann, chief engineer, Harnischfeger Corp., Milwaukee; fifth, $152.63, Joseph Kuchar, chief engineer, Athey Truss Wheel Co., Chicago.

Industry Machinery Sub-Class K-3: Petroleum Making

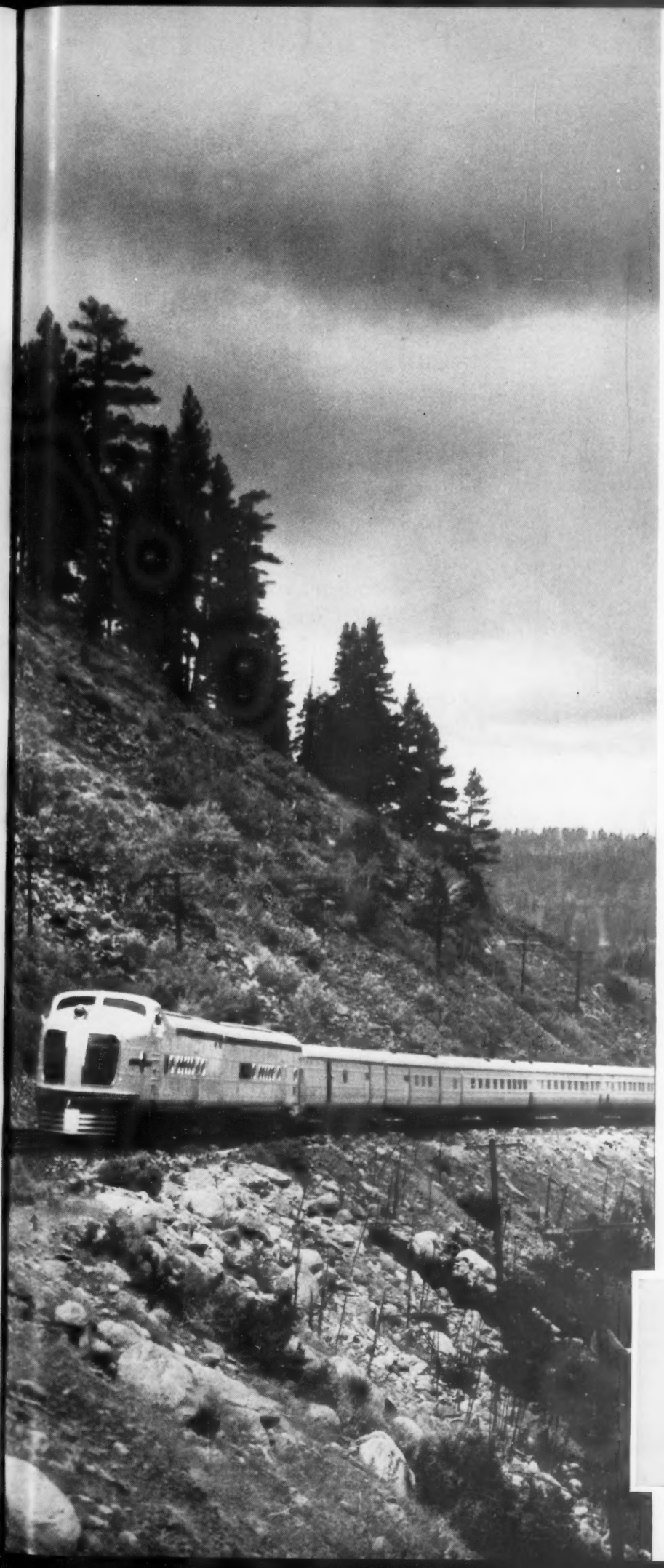
First, $712.28, John F. Muller, power transmission engineer, and J. C. Munoz, general manager, American Pulley Co., Philadelphia; second, $508.77, Philip S. Ball, draftsman and Justus O'Reilly, assistant engineer, Skelly Oil Co., Eldorado, Kans.; third, $305.26, S. W. Reilly, design engineer, and George Heinish, chief engineer, Star Drilling Machine Co., Akron, O.; fourth, $203.51, A. M. Elder, engineer, maintenance department, Gulf Refining Co., Toledo, O.; fifth, $152.63, G. W. Woods, and R. S. Grant, engineers, Hughes Tool Co., Houston, Tex.

Industry Machinery Sub-Class K-4: Steel Making

Second, $508.77, David Fliegelman, chief draftsman, and Peter E. Kop, designer of new developments, Coppus Engineering Corp., Worcester, Mass.; third, $305.26, James Goodell, Kearneysville, W. Va.; fourth, $203.51, Warner Kenyon, engineer and draftsman, American Rolling Mill Co., Ashland, Ky.; fifth, $152.63, H. C. Funk, chief draftsman, rolling mill division, E. W. Bliss Co., Salem, O.

Industry Machinery Sub-Class K-5: Farming Machinery

First, $712.28, G. O. Matter, consulting engineer, Bagan Rotary Plow Co. and Progressive Machinery Co., Port-



☆

How to run a train across the country on $100 worth of fuel

☆

Problem: In spite of tremendous advances in passenger transportation, the railroads were not satisfied. They wanted faster schedules and still lower operating costs.

Answer: Lightweight streamliners! Glistening trains that speed across the continent in 56 hours at a low fuel cost undreamed of a few years ago. This progress has been made possible largely by a new type of Diesel engine of phenomenal efficiency. And contributing importantly to the success of these engines are modern abrasives made by Carborundum.

Without abrasives the vital fuel pump and injector parts could not be made accurate to fifty millionths of an inch. Without abrasives pistons, wrist pins, crankshafts, camshafts and other parts could not be finished to limits which insure trouble-free operation for an almost unbelievable number of hours.

The Carborundum Company is justly proud of the part played by its abrasive products in the development of internal combustion motive power for the American railroads.

AN INVITATION TO EXECUTIVES CONCERNED WITH MANUFACTURING

Whatever you make, there are two ways in which The Carborundum Company's Abrasive Service can help your company. Highly trained abrasive engineers are ready to help solve any special grinding or finishing problem that may confront you. Also, without obligation, they will study your present abrasive set-up, report on its efficiency and, wherever possible, indicate how production can be improved or savings effected. Write to The Carborundum Company, Niagara Falls, N.Y. and a representative will call.

CARBORUNDUM

REG. U.S. BRAND PAT. OFF.

ABRASIVE PRODUCTS

FOR ACCURACY AND ECONOMY IN MANUFACTURE

"A FLEXIBLE, ECONOMICAL UNIT *for* HANDLING PIPE"...

Loading and unloading big pipe can be one of those slow, costly handling jobs which is eating up the profits in many plants today. Or, it can be handled the way the Industrial Engineering Company of Los Angeles do it. Here is what they say:

"We are finding our Industrial Brownhoist crane a very fine unit. It is both flexible and economical for unloading pipe from railroad cars and trucks, handling Somastic coated pipe from cooling racks and stockpiling and loading out finished Somastic coated line pipe."

Do you have any handling work on which you would like to check your costs? Let an Industrial Brownhoist sales engineer help you. His experience on thousands of jobs like the above cannot but help be of value to you.

LOCOMOTIVE CRANES, 10 TO 200 TONS CAPACITY
CRAWLER CRANES, 6 TO 25 TONS CAPACITY
ERECTION CRANES, 10 TO 75 TONS CAPACITY
ORE AND COAL HANDLING BRIDGES
CAR DUMPERS FOR COAL AND ORE
CLAMSHELL BUCKETS

INDUSTRIAL BROWNHOIST

GENERAL OFFICES: BAY CITY, MICHIGAN

DISTRICT OFFICES

New York, Philadelphia, Pittsburgh, Cleveland, Chicago,
Agents in Other Principal Cities

land, Oreg.; second, $508.77, J. R. Love, engineer, Love Tractor Co., Benton Harbor, Mich.; third, $305.26, David A. Morrison, Dan M. Morrison & Son, Lewistown, Mont.; fourth, $203.51, Alex McCrerey, Hiawatha, Kans.; fifth, $152.63, Charles Rader, William Myers Welding Works, Fresno, Calif.

Industry Machinery Sub-Class K-6: Household Machinery

First, $712.28, Ludwig F. Funke, head of experimental and research department, Sunbeam Electrical Mfg. Co., Evansville, Ind.; second, $508.77, Scott Van Etten, manager and superintendent, Colvan Stoker Co., Columbus, O; third, $305.26, George A. Gowdy, chief engineer, stoker division, Morse Chain Co., Ithaca, N. Y.; fourth $203.51, James M. White, chief engineer, Gray & Dudley Co., Nashville, Tenn.; fifth, $152.63, Roy I. Tribble, shop foreman, Security Stove & Mfg. Co., Kansas City, Mo.

Industry Machinery Sub-Class K-7: Food Making

First, $712.28, Ernst Duesing, foreman, sheet welding and metal department, Oliver Machinery Co., Grand Rapids, Mich.; second, $508.77, Nelson M. Fuller, consultant, Oakes & Burger Mfg. Co., Cattaraugus, N. Y.; third, $305.26, Allan E. Beckett and George H. Beckett, machinists, Canadian Canners Ltd., Misson City, B. C.; fourth, $203.51, H. W. Harrigan, manager, drying machinery division, Hersey Mfg. Co., South Boston, Mass.; fifth $152.63, R. E. Lasher, mechanical engineer and general manager, Munson Mill Machinery Co., Utica, N. Y.

Industry Machinery Sub-Class K-8: Textile and Clothing Machinery

Second, $508.77, Adolph V. Bulaw, vice president, Bulaw Welding Co., Chicago; third, $305.26, Harry A. MacKnight, superintendent, Winsor & Jerauld Mfg. Co., Providence, R. I.; fourth, $203.51, W. E. Shefelton, production supervisor, R. D. Cole Mfg. Co., Newman, Ga.; fifth, $152.63, William Shaw, Providence, R. I.

Industry Machinery Sub-Class K-9: Printing Machinery

First, $712.28, Lloyd A. Whittaker, chief engineer, Thomson National Press Co., Franklin, Mass.; second, $508.77, Leonard L. F. Remington, works manager, Thomson National Press Co., Franklin, Mass.; third, $305.26, Howard H. Tunis, research engineer, Waverly Press Inc., Baltimore.

Industry Machinery Sub-Class K-10: Machine Parts

Third, $305.26, G. O. Marrs, consulting engineer, Universal Equipment Co., Denver; fourth, $203.51, Alfred G. Leach, Oakland, Calif.; fifth, $152.63, M. L. White, proprietor, Hollostone Co., Los Angeles, and C. W. Wells, proprietor, C. W. Wells Welding Works, North Hollywood, Calif.

HONORABLE MENTION AWARDS OF $101.75 EACH

A-2 Automotive Bodies: Arthur Brown, designing engineer, Heil Co., Milwaukee.

A-3 Automotive Frames: Harold Bickford, chief engineer, Lombard Traction Engine, Waterville, Me.; David G. Hall Jr., San Diego, Calif.

A-4 Automotive Trailers: Carl Braatz, superintendent, Hammerblow Tool Co., Wausaw, Wis.; H. S. Berkey, Placentia, Calif.

B-2 Aircraft Fuselages: W. F. Savage, aeronautical structural engineer, and J. B. Johnson, chief, material branch, U. S. Army Air Corps, Dayton, O.; Ray P. Holland Jr., aeronautical engineer, Curtiss Airplane division, Curtiss-Wright Corp., Buffalo.

C-4 Railroad Locomotive and Car Parts: Frederick H. Williams, Mt. Royal, Quebec.

D-1 Watercraft Commercial: George F. Wolfe, chairman, welding committee, engineering works division, Dravo Corp., Pittsburgh; Clarence E. Seltzer, Sun Shipbuilding & Dry Dock Co., Chester, Pa.; J. F. Smith, welding engineer, Dravo Corp., Pittsburgh; Norman J. Mackinnon, superintendent, hull construction, and Selwyn H. Towne Jr., assistant chief engineer, Bath Iron Works Corp., Bath, Me.; Dwight True, naval architect, and Russell W. Brindle, foreman, burning and welding department, Great Lakes Engineering Works, River Rouge, Mich.; H. A. Guthans, marine superintendent, Tennessee Coal, Iron & Railroad Co., Mobile, Ala.; C. Perry Streithoff, structural engineer, Dravo Corp., Pittsburgh; Willard E. McCain, assistant superintendent, charge production, Erie Concrete & Steel Supply Co., Erie, Pa.; Eads Johnson, New York; E. L. Shoemaker, chief engineer, Warner Co., Philadelphia; A. L. Pitz, general superintendent, charge design and construction, Manitowoc Shipbuilding Co., Manitowoc, Wis.; Hans A. Branders, ma-

L. J. Carey

Awarded $7326.46 jointly with Marvin Whitlok for their paper "Welded Aircraft Piping"

chine shop superintendent, A. Ahlstrom Osakeyhtio Co., Warkaus, Finland.

D-2 Watercraft Pleasure: Arthur W. King, foreman, hull construction, Bath Iron Works, Bath, Me.; Robert Steele Jr., Marine Iron & Shipbuilding Co., Duluth; Lewis W. Newsom, U.S.E.D., Los Angeles.

E-1 Structural Buildings and Similar Structures: Samuel E. Berkenblit, planning engineer, R. Griesser & Son, architect, Chicago; Charles H. Fork, structural engineer, Los Angeles board of education, Los Angeles; Fausto Masi, engineer, technical department, Soc. An. Antonio Badoni, Lecco, Italy; Dewey M. McCain, State College, Miss.; Richard S. Buck Jr., department of agriculture, Ohio State university, Columbus, O.; W. S. McFetridge and J. W. Hopkins, Bessemer & Lake Erie railroad, Greenville, Pa.; Charles S. Roach, Fairmont Machinery Co., Fairmont, W. Va.; W. J. Duthie, Seattle; James M. Smith, structural engineer, San Francisco; Merrill M. Bush, designing engineer, Austin Co., Detroit; Harris K. Smith, designing structural engineer, Jersey City, N. J.

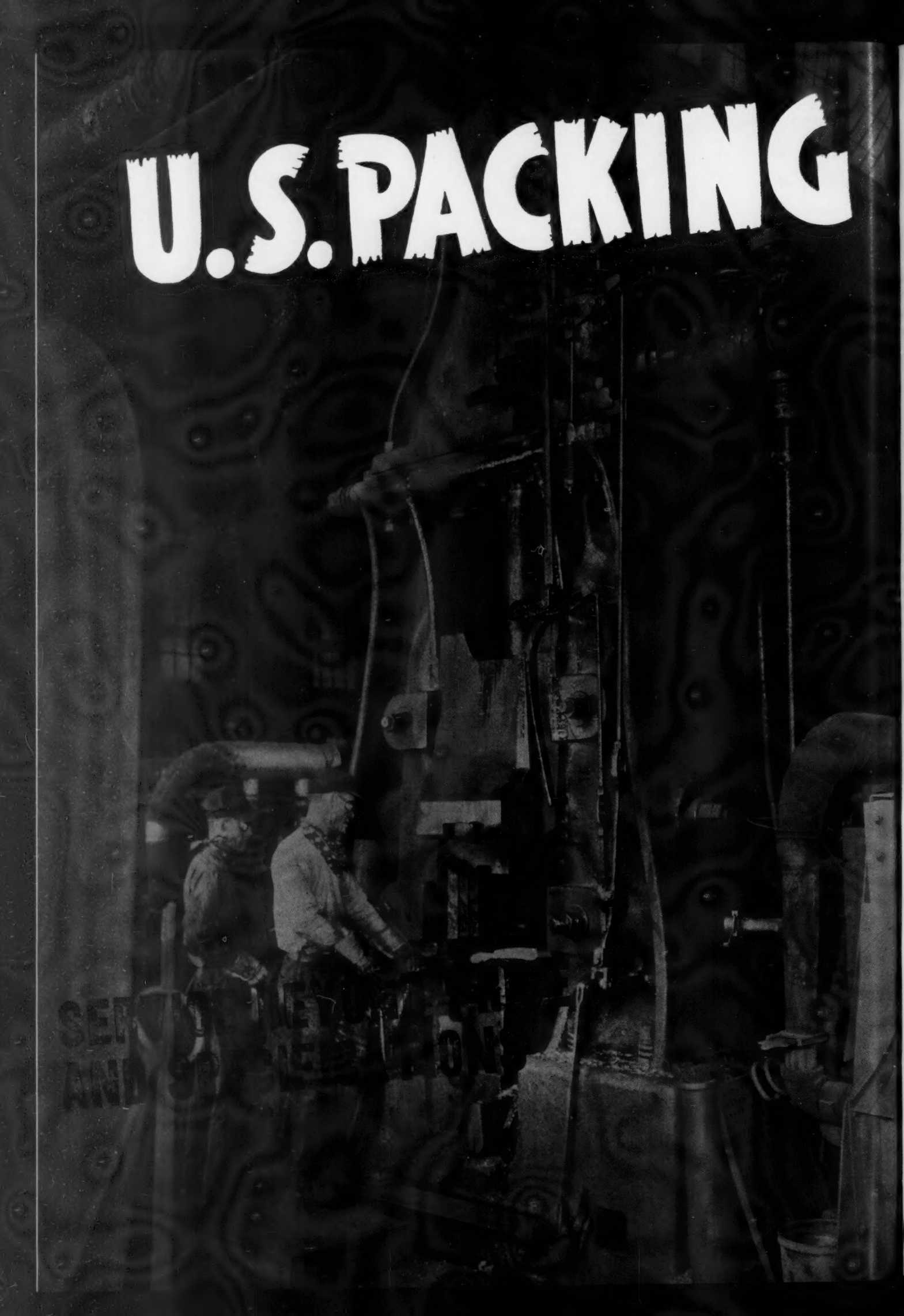
E-2 Structural Bridges: Barnett D. Freedman, designer of highway bridges, Connecticut state highway department, Hartford, Conn.; Ned L. Ashton, designer, Ash, Howard, Needles & Tammen, consulting engineers, Kansas City, Mo.; T. G. Cleaver, sales engineer, Carnegie-Illinois Steel Corp., Pittsburgh; Richard de Charms, superintendent of construction, George A. Fuller Co., New York; Nicholas B. Baloff and Richard R. Tipton, associate highway bridge engineers, U. S. Bureau of public roads, San Francisco; Thomas G. Grisenthwaite, bridge engineer, British Construction Steelwork association, London; K. B. Wolfskill, charge of design, Indiana state highway commission, Indianapolis; Kiser E. Dumbauld and Harry H. Hawley, designing engineers of bridges, Ohio department of highways, Columbus, O.; L. O. Hopkins, chief engineer, Nashville Bridge Co., Nashville, Tenn.; Werner Ammann and Meier G. Hilpert, Bethlehem, Pa.; Claude Darby, structural engineer, Salem, Oreg.; Glenn L. Enke, associate bridge engineer, California division of highways, Sacramento, Calif.; C. H. Sandberg, assistant engineer in charge design, Atchison, Topeka & Santa Fe railroad, Chicago.

E-4 Structural Miscellaneous: George B. Cramp and Myron E. Nixon, mechanical design division, U. S. bureau of reclamation, Denver; Charles R. Martin, executive, and Albert J. Golinick, design engineer, Allis-Chalmers Mfg. Co., Milwaukee; Frank Fredericks, engineer, California Institute of Technology, Pasadena, Calif., and N. L. Mochel, metallurgical engineer, Westinghouse Electric & Mfg. Co., Philadelphia; Martin P. Korn, consulting engineer, Buffalo; Harry Balke, bridge designer, American Bridge Co., Pittsburgh; Charles T. Anderson, designing draftsman, General Electric Co., Lynn, Mass.; R. T. Logeman, engineer, American Bridge Co., Chicago; J. Dickmann, designer, fabricated steel construction division, Bethlehem Steel Co., Bethlehem, Pa.; Richard Pfaehler, Duke Power Co., Charlotte, N. C.; W. M. H. Ballantyne and P. E. Gisiger, engineers, Pennsylvania Water & Power Co., Baltimore; M. G. Driessen, engineer chief of research department, State Mines, Limburg, Holland; John H. Blair, structural designer, Pacific Foundry Co. Ltd., San Francisco; C. L. Gallimore and J. E. Maienschein, U. S. Engineers, Cincinnati; G. F. Allen, structural engineer, and G. Merriman, designer, Detroit Edison Co., Detroit; Julius Glaser, designing engineer, New York City board of transportation, New York.

G-1 Commercial Welding or Job Shops: Floyd Hartwell, consulting engineer, Celeron, N. Y.; Robert L. Worden, Ben Lore Welding Co., Wichita, Kans.; E. G. Hosted, Hosted & Hosted, contractors, Upper Darby, Pa.; Harry L. Hall, manager, Superior Auto & Machine Shop, Marshall, Mo.; Ralph J. Thompson, proprietor, Thompson's Welding & Machine Shop, Rushville, Ill.; L. C. Monroe, Chicago; E. W. Markel, proprietor, Markel Welding Shop, Dickinson, N. D.; Kenneth Bradley, proprietor, Bradley's Machine Shop, Ticonderoga, N. Y.; Charles F. Smith, welder and boilermaker, Lebus Rotary Tool Works, Overton, Tex.; Gordon Y. MacPhee, Camrose, Alberta; Robert Siemer, Buffalo; Harold A. Harris, Harris Welding Works, Roseville, Calif.

H-1 Containers, Contents Stationary (Tanks, etc.): Earnest Hoehn, Zurich, Switzerland; Hugh B. Ferguson and Edward F. Burford, G. A. Harvery & Co., London; Harry P. Eichin, machine designer, Visking Corp., Chicago; Earl D. Hay, instructor, department of mechanical engineering, University of Kansas, Lawrence, Kans.; Robert A. Gifford, plate engineer and superintendent, Southern Boiler & Tank Works Inc., Memphis, Tenn.; E. C. Holley, production superintendent, St. Joseph Railroad Light, Heat & Power Co., St. Joseph, Mo.; Glenn J. Gibson, welding engineer, Pittsburgh-Des Moines Steel Co., Pittsburgh; C. Merrill Barber, consulting engineer, Cleveland; Thomas C. Wright, designer, Warner & Swasey Co., Cleveland; Ernest H. Peters, assistant plant superintendent, Southwest Welding & Mfg. Co. Inc., Alhambra, Calif.

H-2 Containers, Contents Moving (Pipe Lines, etc.): Sumner E. Perkins, mechanical engineer, Flintkote Co., Los Angeles; R. E. J. Summers, president, and J. Borge, consulting engineer, Summers En-


U.S. PACKING

LASTS 5 Times longer

FORMER PACKING LASTED *ONLY* 8 WEEKS... U. S. PACKING LASTS *43 WEEKS* IN GIANT 6000-lb. STEAM HAMMER! ANOTHER EXAMPLE OF SERVICE BEYOND PRICE AND SPECIFICATIONS

Under 140 pounds of steam, this giant three-ton hammer operating in a famous steel mill was thumping the life out of ordinary packings in 8 weeks' time! In search of a tougher, longer-lived packing that could stand up and take it, they called on U. S. Rubber! We gave them a U. S. Ring Combination which not only packed the job successfully... but lasted 43 weeks... exactly *5 times longer* than the packing formerly used! This true story of Service Beyond Price and Specifications is a good example of why thousands of manufacturers find it pays to use U. S. Packings in every industrial application!

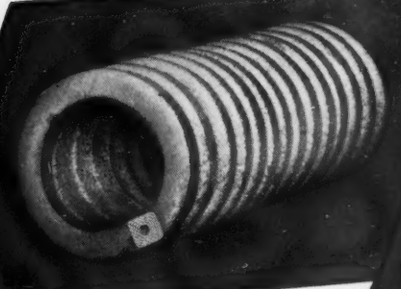
Write for U. S. Packing Catalog, if you do not have a copy—and you are a Packing User.

UNITED STATES RUBBER COMPANY · US · TRADE MARK

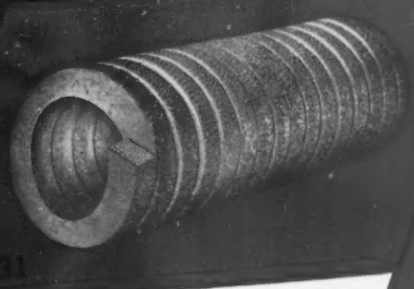
United States Rubber Company

United States Rubber Products, Inc., New York, N. Y.

THESE ARE THE U. S. PACKINGS THAT LASTED 5 TIMES LONGER



• **U. S. Hollow Core Rod and Plunger Packings,** in spiral, coil and ring form pack against medium pressure steam, hot or cold water and ammonia. High-grade closely woven duck cemented with strong rubber friction, thoroughly lubricated and graphited. *Page 36 of your U. S. Packing Catalog.*



• **U. S. Peerless Cross Expansion Packing,** in spiral, coil or ring form, permits expansion in either direction, is designed for packing reciprocating rods and plungers against steam, hot or cold water, ammonia, alcohol, light and mineral seal oils. Diagonally laid plies of closely woven duck, lubricated and graphited. *Page 34 of your U. S. Packing Catalog.*

• **U. S. Molded Wedge Packing,** coil or ring form, differs from all other sectional packings in that it is made with molded wedges. The two sections are held together with lightly braided cotton jacket. The design and construction permits an automatic adjustment of the packing to pressures encountered in service. *Page 37 of your U. S. Packing Catalog.*

gineers & Constructor Inc., New York; Eric R. Seabloom, research welding engineer, Crane Co., Chicago; M. E. Nantz and F. Heidinger, designers, U. S. bureau of reclamation, Denver; R. E. Hughes, district foreman, Standard Oil Co. of Louisiana, Oxford, La.; Nathaniel J. Kendall, assistant engineer, California Water Service Co., San Francisco; R. C. Doremus, refrigerating engineer, George B. Bright Co., Detroit; Lt. Col. Michael J. Blew, research engineer, bureau of engineers, surveys and zoning, department of public works, Philadelphia; William Landsiedel, Milwaukee sewerage commission, Milwaukee; Charles A. Pfeiffer, draftsman, Morrell Vrooman Inc., Gloversville, N. Y.

I-1 Commercial Welderies: Hugh Fairclough, engineer, physical research laboratory, Dow Chemical Co., Midland, Mich.; J. G. Brown Jr., general welding foreman, Atlantic Refining Co., Philadelphia; Andrew Scott, welding supervisor, Messrs. Stewarts & Lloyds Ltd., Glasgow, Scotland; Gilbert G. Coombs, machine shop foreman, Pan American Refining Corp., Texas City, Tex.

I-2 Plant Welderies: Harry A. Erickson, heating and piping estimator, Burbank, Calif.; Charles F. Zappone, supervisor element department, Robertshaw Thermostat Co., Youngwood, Pa.; S. O. Jones, welding engineer, Newport News Shipbuilding & Dry Dock Co., Newport News, Va.; W. H. Duffield, Fife, Scotland; George W. Linkhauer, production, inspection and engineering department, United Engineering & Foundry Co., Pittsburgh; A. P. Maradudin and Charles P. Miller, engineers, Standard Oil Co. of California, Berkeley, Calif.; A. R. Eckberg, assistant superintendent of engineering and maintenance, Eastman Kodak Co., Rochester, N. Y.; H. Louis Duchesne, instructor, Scovill Mfg. Co., Waterbury, Conn.

J-1 Functional Machinery, Metal Cutting: Elmer E. Isgren, plant superintendent, R. G. Le Tourneau Inc., Peoria, Ill.; Lansing Millis, welder foreman, American Bridge Co., Gary, Ind.; John S. Green, superintendent, Ross Heater & Mfg. Co., Buffalo.

J-2 Functional Machinery, Metal Forming: George E. Kentis Jr., Yoder Mfg. Co., Cleveland.

J-5 Functional Machinery, Conveying: Walter J. Brooking, engineering department, R. G. Le Tourneau Inc., Peoria, Ill.; John Toretti, welder, American Steel & Wire Co., Donora, Pa.; Arthur Warner, mechanical engineer, Suspension Conveyor Co., Haverford, Pa.; P. A. Fanner, engineer, Industrial Brownhoist Corp., Bay City, Mich.; Paul A. Smith, designing engineer, Barber-Greene Co., Aurora, Ill.; Charles B. Wade, welding foreman, Norfolk & Western railway, Roanoke, Va.; Edwin C. Rosenberg, chief engineer and superintendent of production, F. Rosenberg Elevator Co., Milwaukee; Erwin C. Brekelbaum, welding foreman, Harnischfeger Corp., Milwaukee; Kenneth G. Wilkes, junior civil engineer, bureau of water works and supply, Los Angeles; Paul Coddington, president, Lakeside Bridge & Steel Co., Milwaukee; Karl T. Davis, vice president, Tate-Jones & Co. Inc., Lettsdale, Pa.

J-6 Functional Machinery, Pumps and Compressors: Elek K. Benedek, consulting engineer, General Hydraulic Co., Bucyrus, O.

J-8 Functional Machinery, Not Otherwise Classified: Abbott Allen, Abbott Allen Co., Medford, Mass.; William E. Hedderich, plant engineer, Greenlee Bros. & Co., Rockford, Ill.; Raymond O. Krengel, machine designer and assistant to chief engineer, Revere Copper & Brass Co., Chicago; George K. McNeill, designer of special machinery, U. S. Rubber Products Inc., Detroit; J. H. Pollard, chief engineer, Duval Texas Sulphur Co., Houston, Tex.; J. S. Bennett III, mechanical engineer, American Engineering Co., Philadelphia; Edwin O. Martinson, designing engineer, American Machine & Metals Inc., East Moline, Ill.; Lucien Eaton, consulting engineer, Isle Royale Copper Co., Houghton, Mich.; Thomas E. Raymond, president and chief engineer, Simplex Engineering Co., Zanesville, O.; Howard A. Hayden, vice president, Ace Drill Co., Detroit; Harry C. Petrie, owner, Ballard Welding Service, Seattle; J. A. Auld, chief engineer, and C. A. Carney, bucket engineer, Erie Steel Construction Co., Erie, Pa.; Edward H. Kuhn, designer, Baker-Raulang Co., Cleveland; Roy Kayler, machinist in charge shop, University of Idaho, Moscow, Idaho; Albert Upmalis, engineer, Riga, Latvia.

J-9 Functional Machinery, Jigs and Fixtures: Harold F. Wahl, tool designer and engineer, Willamette Hyster Co., Portland, Oreg.; Wren A. Dawson, chief tool designer, Oliver Farm Equipment Co., Charles City, Iowa; Ernest Kirshtner, foreman, and Ernest L. Kirshtner, draftsman, Austin Western Road Machinery Co., Harvey, Ill.; B. A. Jacobs, welder, Phillips Petroleum Co., Bartlesville, Okla.; H. A. Sedgwick, general superintendent, Cutler-Hammer Inc., Milwaukee.

J. O. Bishop

Awarded $2747.39 for his paper "Universal Manipulator"

J-10 Parts of Functional Machinery: Walter D. Myers and Michael Fourny, engineering staff, Safe Harbor Water Power Corp. and Pennsylvania Water & Power Co., Baltimore; B. A. Hausfeld, welding department, Dayton Fabrication Steel Co., Dayton, O.; G. Johansson, designing engineer, Bucyrus-Erie Co., Milwaukee; Gustaf A. Rehnberg, foreman, sheet metal department, Norton Co., Worcester, Mass.; Arthur H. Williams, chief engineer, Shafer Bearing Corp., Chicago.

K-1 Industry Machinery, Processing: Joe Baxter Jr., sales engineer, Shartle Bros. Machine Co., Middletown, O.; L. C. Haffner, West Oregon Lumber Co., Portland, Oreg.; A. F. Blair, sales and advisory engineer, Garrett & Schafer Engineering Works, Seattle; Gordon Busfield, Research Construction Corp., Bound Brook, N. J.; Walter J. Hartwig, designer, D. J. Murray Mfg. Co., Wausau, Wis.; Paul E. Lehmann, welder, and William A. Spinti, chief draftsman, Milwaukee Gas Light Co., Milwaukee; Harold B. Coulter, chief mechanical engineer, Dorr Co. Inc., New York; Victor Windett, St. Petersburg, Fla.; Asher H. Patten, chief engineer, Denver Equipment Co., Denver; E. J. Chapman, detail draftsman Bagley & Sewall Co., Watertown, N. Y.; A. J. Aubin and H. W. French, engineers, Hammermill Paper Co., Erie, Pa.; Ernest Davis, chief engineer, Prosperity Co. Inc., Syracuse, N. Y.; E. H. Fleischman, draftsman, Keystone Portland Cement Co., Bath, Pa.; William J. Edbrooke, designing engineer, Bucyrus-Erie Co., Milwaukee.

K-2 Industry Machinery, Construction: H. L. Mitchel, designing engineer, Koehring Co., Milwaukee, and F. Mitchel, chief engineer, Milwaukee Bridge Co., Milwaukee.

K-3 Industry Machinery, Petroleum: Fred C. King Jr., draftsman, National Supply Co., Torrance, Calif.; L. W. Mosley, owner, Baker Oil Tools Inc., Huntington Park, Calif.; R. H. Biggs, Midland, Tex.; Joseph W. Gasper, designer, Maine Machine Works Ltd., Gardena, Calif.; W. C. Russell, superintendent, structural division, and L. W. Stahl, chief engineer, mechanical division, Emsco Derrick & Equipment Co., Houston, Tex.

K-4 Industry Machinery, Steel Making: A. R. Mitchell, assistant master mechanic, and H. Q. Gruell, welding superintendent, Andrews Steel Co., Newport, Ky.; J. G. McGregor, assistant managing director, Thomas Foord, chief draftsman, William Gentles, works manager, and William Brown, draftsman, Murray & Patterson, Coatbank Engine Works, Coatbridge, Scotland; Howard E. Dykeman, Evans City, Pa.

K-5 Industry Machinery, Farming: Edouard Thys, chief engineer, E. Clemens Horst Co., Sacramento, Calif.; Evert S. Wells, Post Bros. Tractor Rental Service, Long Beach, Calif.

K-7 Industry Machinery, Food Making: William C. Willard, chief draftsman, Buffalo Forge Co., Buffalo; David Oberg, designer, Smith Mfg. Co., San Jose, Calif.

K-10 Industry Machinery, Not Otherwise Classified: E. J. Wesp, engineer, Canton Foundry & Machine Co., Cleveland; T. F. Rataiczak, chief engineer, and G. B. Fox, production manager, dishwasher division, Hobart Mfg. Co., Troy, O.; A. W. Durr, development engineer, American Hard Rubber Co., Akron, O.; Geoffrey M. Harry, manager, Springfield Wagon & Trailer Co., Springfield, Mo.

◆

Alloy for Precision Radio Applications

■ Because of its low coefficient of expansion, Nilvar, a nickel-iron alloy produced by Driver-Harris Co., Harrison, N. J., is finding application where constancy of dimensions must be maintained.

Already it has been used in manufacture of bimetallic strip, measuring tapes, length standards and similar products. In the form of rotor and stator plates of variable condensers, Nilvar is being used in ultra-high-frequency radio equipment.

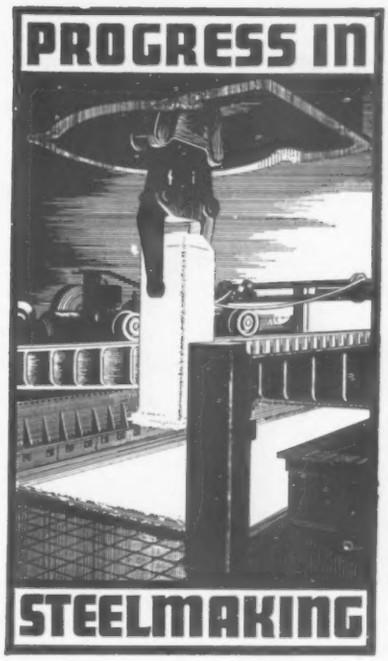
Announces Abrasive Line

■ Announcement has been made by M. P. Iding Disc Grinding Compound Co., Milwaukee, of a line of aluminum oxide and silicon carbide abrasives.

Their aluminum oxide abrasive, Idilite, is manufactured in two types: ET, or etched grains, which possess high capillary and sharp-cutting qualities; and NT, or non-etched grains, which have long-wearing qualities and produce bright finishes.

Idilon, their silicon carbide abrasive, gives good results when used to polish gray iron of all kinds.

ADVERTISING PAGES REMOVED



Remote Temperatures

Device indicates temperatures without contacting or being adjacent to work. Eliminates temperature differential between furnace and work from control system, increasing accuracy

■ EQUIPMENT recently developed makes it possible to determine temperatures of hot objects without measuring equipment being in contact or immediately adjacent to the pieces whose temperatures are being read. Such equipment has a number of advantages in heat treating, forging, rolling and various other metalworking operations. Typical of this equipment is the Rayotube developed by Leeds & Northrup Co., Philadelphia.

There are in general two types of such equipment. Fig. 1 shows wide-angle type which measures average temperature of a comparatively large area of the hot body. In this type, energy from hot body passes through an opening in tube end and is focused upon thermopile element at far end of tube by means of a

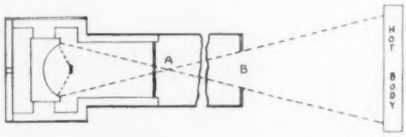


Fig. 1—Wide-angle, mirror type. Covers field shown by base of cone with apex at A and limited in size by aperture B

mirror. Field viewed is limited by aperture B.

This type is suitable for such applications as measuring furnace temperatures. The Rayotube is held outside furnace wall and focused upon closed end of a target tube mounted in furnace wall. It is connected to a Micromax instrument measuring the temperature and concontrolling fuel. As end of the target tube projects into the furnace, it is always at furnace temperature. Rayotube mounted on outside furnace wall sights through the open end of the target tube, measures radiation from closed end and indicates temperatures. With this system thermocouples are not subjected to the damaging heat inside furnace.

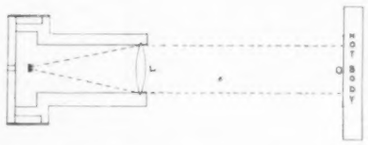


Fig. 2—Narrow-angle, lens type. Distance from O to L can be adjusted so field at O need be no larger than lens at L

The second or narrow-angle type diagramed in Fig. 2 utilizes a lens to focus radiation from hot body upon thermopile at far end of instrument. These afford temperature indications over very small areas such as individual pieces of a line of moving parts in a continuously operated furnace. In use this type has the appearance of a telescope mounted outside the furnace and focusing through the wall to afford indication of temperatures of parts inside furnace as shown in Fig. 3.

Such equipment has several advantages. For instance the narrow-angle type is valuable in determining temperature at which work is dropped into quench tank in a continuous heat-treating setup. It provides means by which temperature of the work as it drops into the quench can be controlled directly from temperature of the work itself instead of indirectly by measuring furnace temperature. This eliminates temperature differences between work and furnace and assures work being quenched at exact specified temperatures.

In heat-treating work where temperatures are apt to be quite critical, metallurgists can specify accurately the actual temperatures at which work should be quenched. Using a Rayotube focused upon the work itself at the point where it drops into the quench tank, affords accurate quench temperature control with subsequent increase in uniformity and accuracy of heat treatment.

Being outside the furnace, Rayo-

(*Please turn to Page* 141)

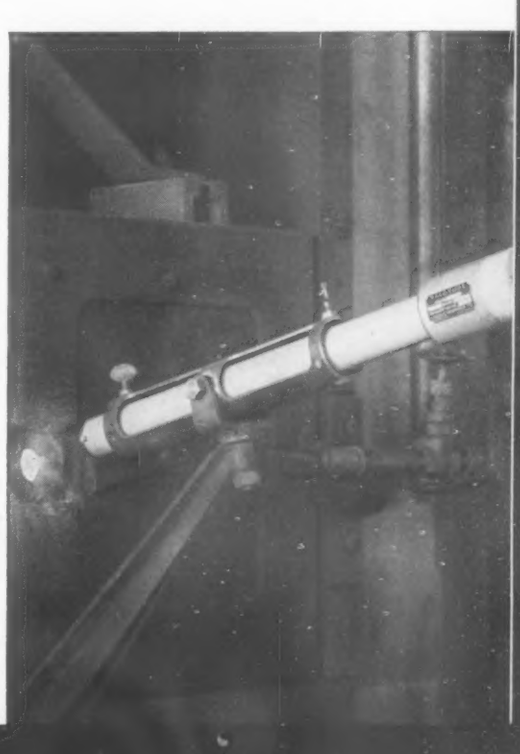
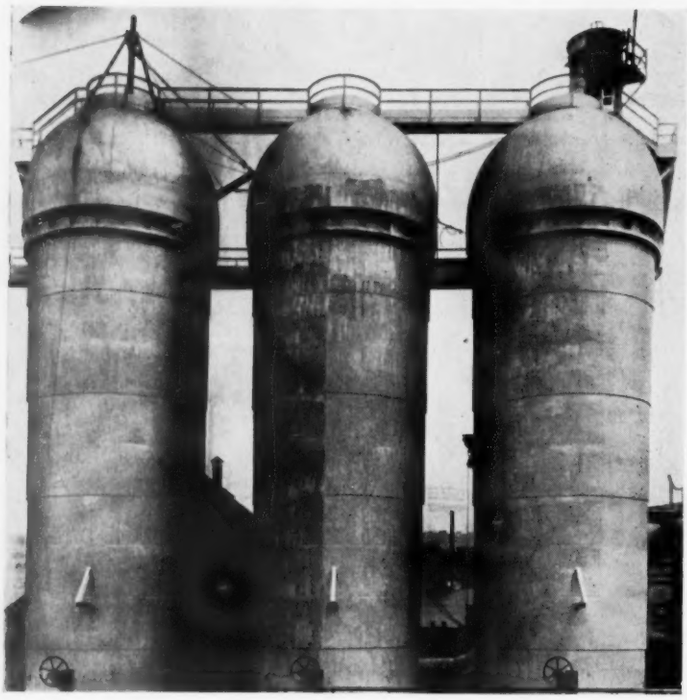


Fig. 3—Lens or telescopic type Rayotube focused upon work in furnace and sighted through small hole in furnace wall

THE BAILEY COMPANY

Suggests . . . .

PROFITS AT THE BLAST FURNACE RESULT FROM THE SELECTION OF THE BEST AUXILIARY EQUIPMENT



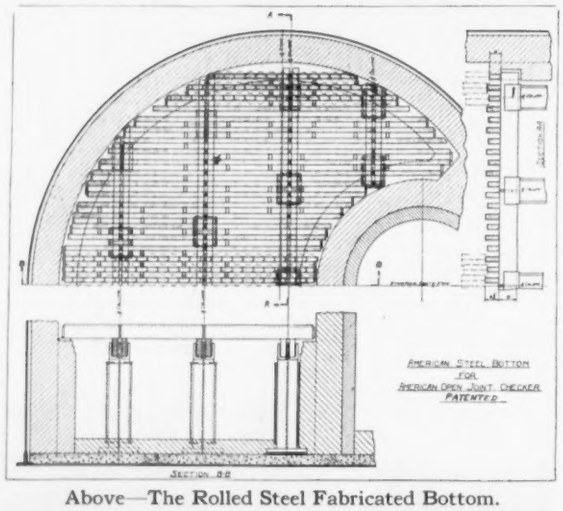
THE WELDED STEEL SHELL—Smooth inside shell surface—No leaking rivets.

THE HEMISPHERIC DOME—Allows the brick shell wall lining to expand and contract without interfering with Dome Brick.

THE TELESCOPIC SHELL—Allows for increasing insulation thickness in hot zones of stove without changing thickness of brick shell wall.

THE ROLLED STEEL FABRICATED BOTTOM—Supports checkers and eliminates upkeep of brick arches.

THE OPEN JOINT CHECKER—The checker shape that equalizes the flow of gases throughout the entire checker chamber, due to cross-circulation through the open joints.



Above—The Rolled Steel Fabricated Bottom.

Maximum Heating Surface Obtainable with Same Size Flue

Maximum Brick Weight in Hot Zones of Stove

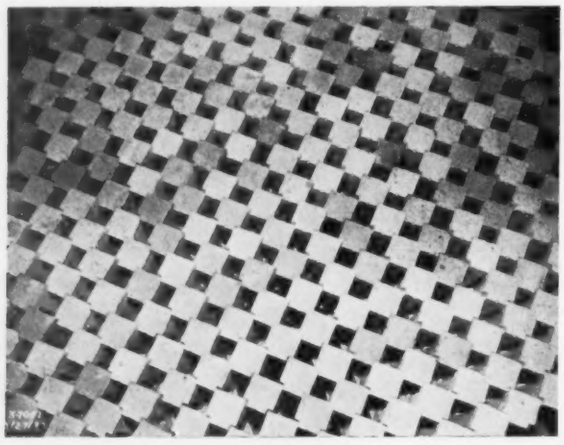
Complete Cross-Circulation of Gases

Channeling Eliminated

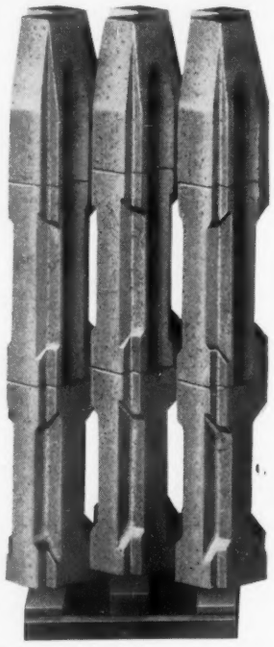
Clogging of Any Flue Entire Length Impossible

No Obstructions in Flue to Interfere with Cleaning when Necessary

Low Labor Cost



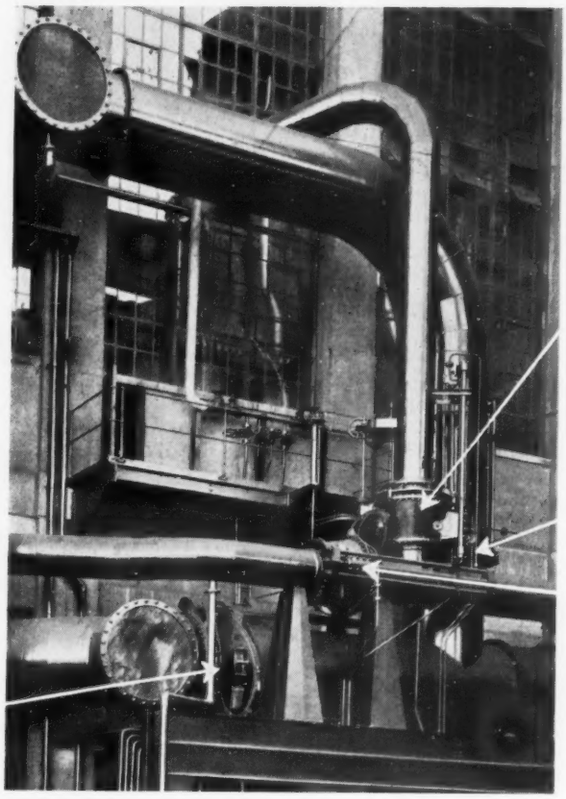
Left—Top view of course of straight checkers. Note—each and every brick is locked on all four corners with four adjoining brick.



Inlet Checker
Top Checker
Straight Checker

Let our Engineers, with their ability and accumulated knowledge from many plants, give you the benefit of their wide experience in the selection of the best equipment.

● THE THERMAL GOGGLE VALVE
● THE MECHANICAL GOGGLE VALVE



Thermal Valves in Vertical and Horizontal Gas Mains

These Valves Have Proven the Best for Hot or Cold—Dirty or Clean Gas Mains

At

GAS WASHERS
PRECIPITATORS
BOILER PLANTS
BLAST FURNACES

●

Over $800,000 Worth of these Valves Installed and In Satisfactory Operation in 12 Years

●

Hand Operated Mechanical Valve. One hand chain operates Valve. One hand chain swings Plate.

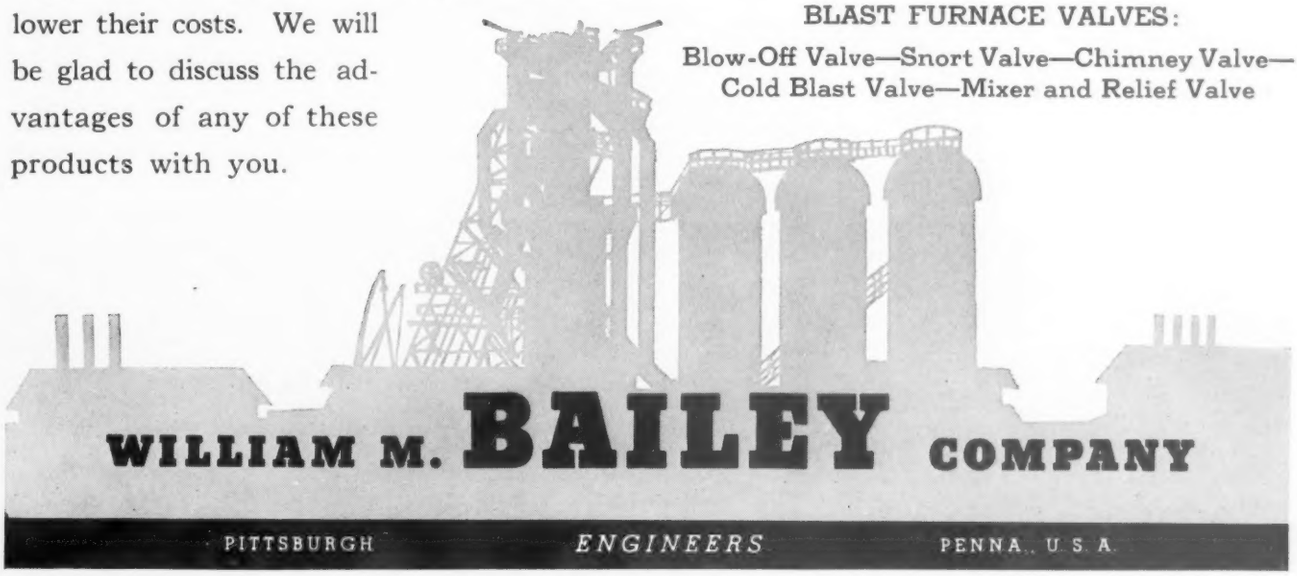
All our Products are Guaranteed as to quality and satisfactory operation. May we assist your Engineers and Blast Furnace Operators in their selection of the proper equipment to improve their operations and lower their costs. We will be glad to discuss the advantages of any of these products with you.

BAILEY PRODUCTS

The Stationary Wheel Pig Casting Machine
The Bailey Tile Primary Gas Washer
The Sintering Plant Pug Mill
The Vreeland Pug Mill for Dust Catchers
The Bailey Clay Gun
The American Safety Cinder Notch Stopper

BLAST FURNACE VALVES:

Blow-Off Valve—Snort Valve—Chimney Valve—
Cold Blast Valve—Mixer and Relief Valve



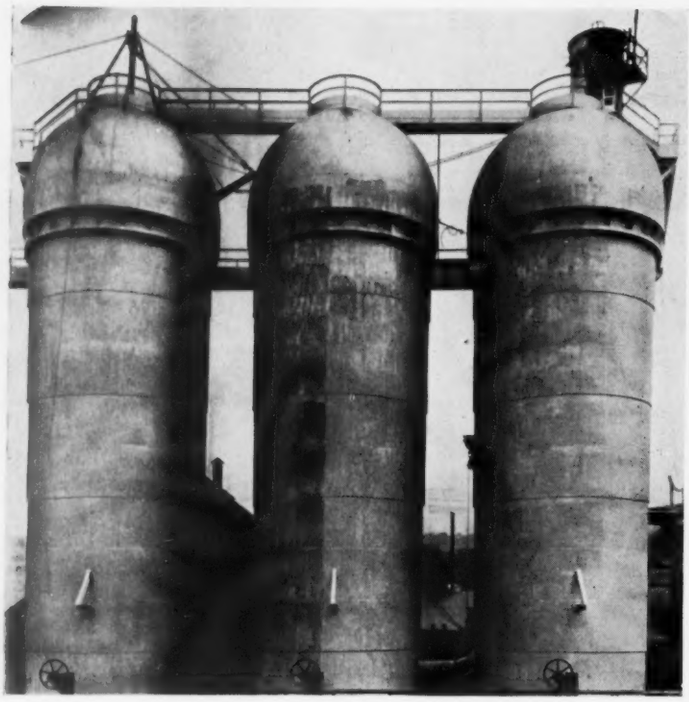
WILLIAM M. BAILEY COMPANY

PITTSBURGH *ENGINEERS* PENNA., U. S. A.

THE BAILEY COMPANY

Suggests . . . .

PROFITS AT THE BLAST FURNACE RESULT FROM THE SELECTION OF THE BEST AUXILIARY EQUIPMENT



●

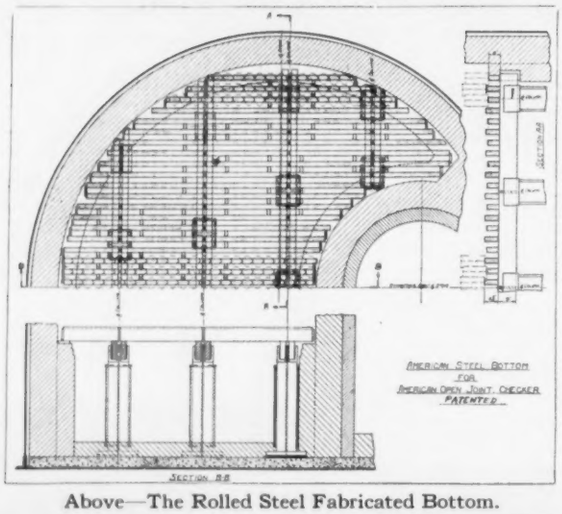
THE WELDED STEEL SHELL—Smooth inside shell surface—No leaking rivets.

THE HEMISPHERIC DOME—Allows the brick shell wall lining to expand and contract without interfering with Dome Brick.

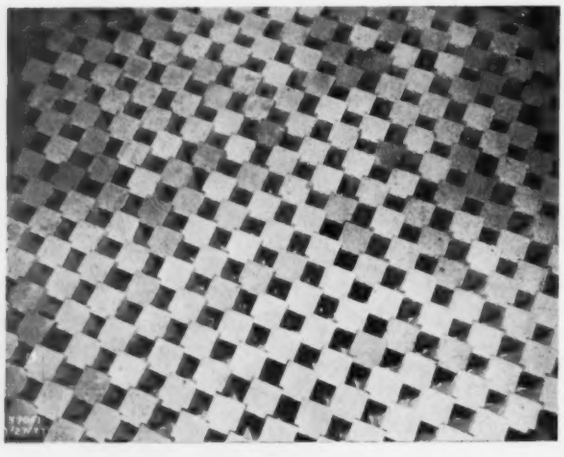
THE TELESCOPIC SHELL—Allows for increasing insulation thickness in hot zones of stove without changing thickness of brick shell wall.

THE ROLLED STEEL FABRICATED BOTTOM—Supports checkers and eliminates upkeep of brick arches.

THE OPEN JOINT CHECKER—The checker shape that equalizes the flow of gases throughout the entire checker chamber, due to cross-circulation through the open joints.



Above—The Rolled Steel Fabricated Bottom.



Left—Top view of course of straight checkers. Note—each and every brick is locked on all four corners with four adjoining brick.

Maximum Heating Surface Obtainable with Same Size Flue

Maximum Brick Weight in Hot Zones of Stove

Complete Cross-Circulation of Gases

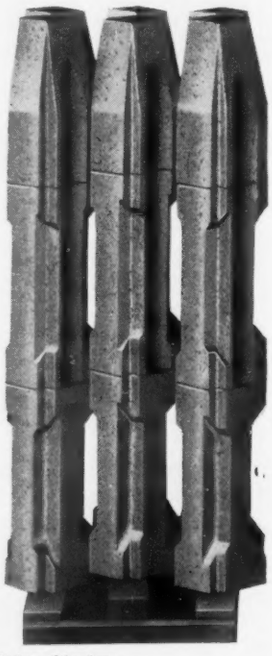
Channeling Eliminated

Clogging of Any Flue Entire Length Impossible

No Obstructions in Flue to Interfere with Cleaning when Necessary

Low Labor Cost

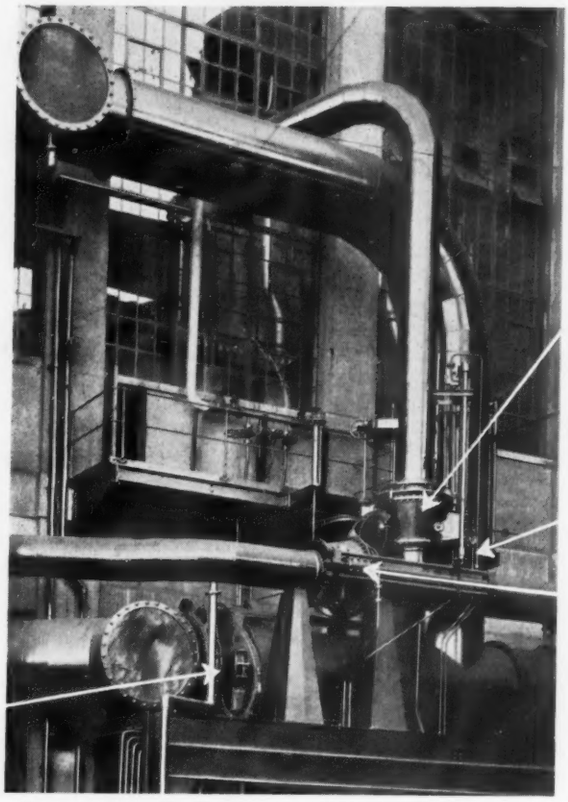
●



Inlet Checker
Top Checker
Straight Checker

Let our Engineers, with their ability and accumulated knowledge from many plants, give you the benefit of their wide experience in the selection of the best equipment.

● THE THERMAL GOGGLE VALVE
● THE MECHANICAL GOGGLE VALVE



Thermal Valves in Vertical and Horizontal Gas Mains

These Valves Have Proven the Best for Hot or Cold—Dirty or Clean Gas Mains

At

GAS WASHERS
PRECIPITATORS
BOILER PLANTS
BLAST FURNACES

●

Over $800,000 Worth of these Valves Installed and In Satisfactory Operation in 12 Years

●

Hand Operated Mechanical Valve. One hand chain operates Valve. One hand chain swings Plate.

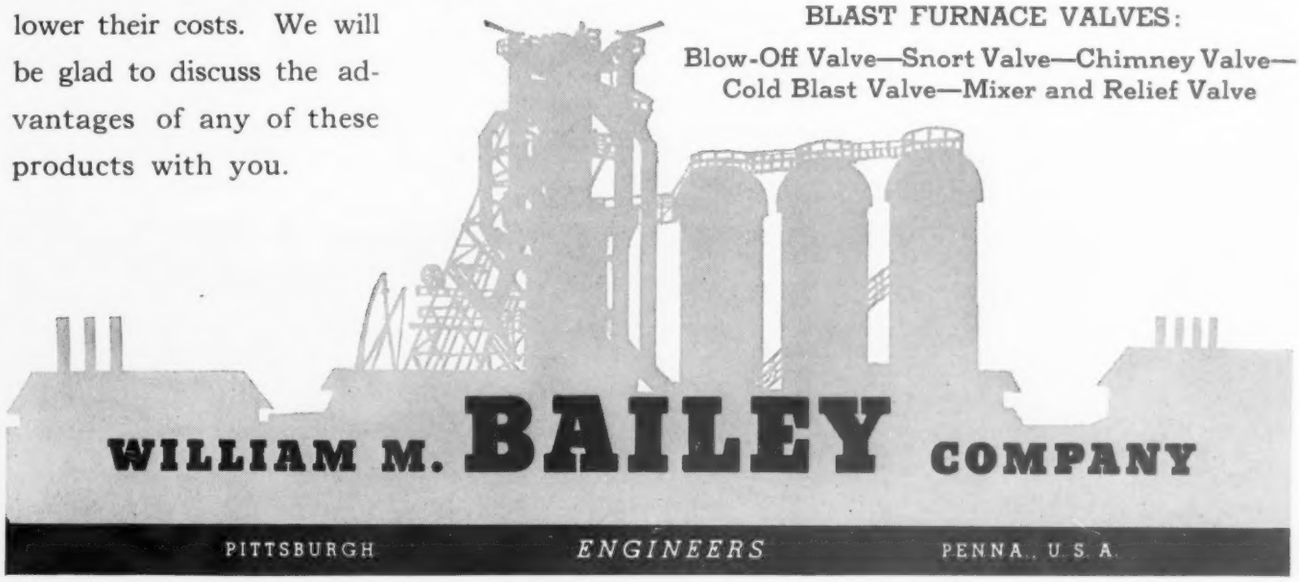
All our Products are Guaranteed as to quality and satisfactory operation. May we assist your Engineers and Blast Furnace Operators in their selection of the proper equipment to improve their operations and lower their costs. We will be glad to discuss the advantages of any of these products with you.

BAILEY PRODUCTS

The Stationary Wheel Pig Casting Machine
The Bailey Tile Primary Gas Washer
The Sintering Plant Pug Mill
The Vreeland Pug Mill for Dust Catchers
The Bailey Clay Gun
The American Safety Cinder Notch Stopper

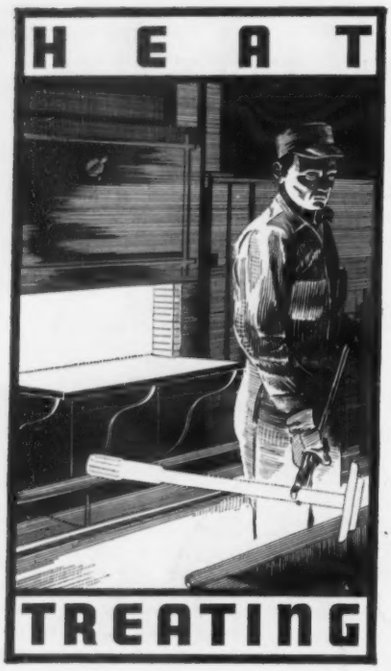
BLAST FURNACE VALVES:

Blow-Off Valve—Snort Valve—Chimney Valve—Cold Blast Valve—Mixer and Relief Valve



WILLIAM M. BAILEY COMPANY

PITTSBURGH *ENGINEERS* PENNA., U.S.A.



Making Springs

Forming and heat treating in connection with spring manufacture requires several specialized types of furnaces. Typical arrangements of such equipment are given

■ MANUFACTURERS of coil and leaf springs have a number of intricate problems in their forming and heat-treating departments. This is particularly true in plants making springs used for trucks, automobiles and railroads where it is necessary to maintain a close control not only over grade of steel used, but also heating operations involved.

During the past few years many furnaces have been built for the spring industry. Each furnace had to be designed to fit a particular process and type of product. In general, three furnaces are used in making springs: Forming furnace, heat-treating furnace, and drawing furnace. These three types of furnaces may assume a number of shapes, depending upon method of handling work and volume of material of a given size.

For example, in one plant manufacturing coil springs almost exclusively a long narrow furnace was used for heating the material prior to forming it into a coil spring. Here quantity of material of one size or shape was small and work was intermittent due to frequent changes in tools required by spring forming machine. As furnace was built to accommodate average length of bar used. it was not long enough for certain bars. To overcome this difficulty the manufacturer found that instead of building a furnace long enough to handle an occasional lot of especially long bars that these long bars could be bent in the middle in a hairpin shape producing a length easily accommodated.

Fig. 1—Furnace used to heat bars prior to forming operations. Photos courtesy Pennsylvania Industrial Engineers, Pittsburgh

Scale at Minimum

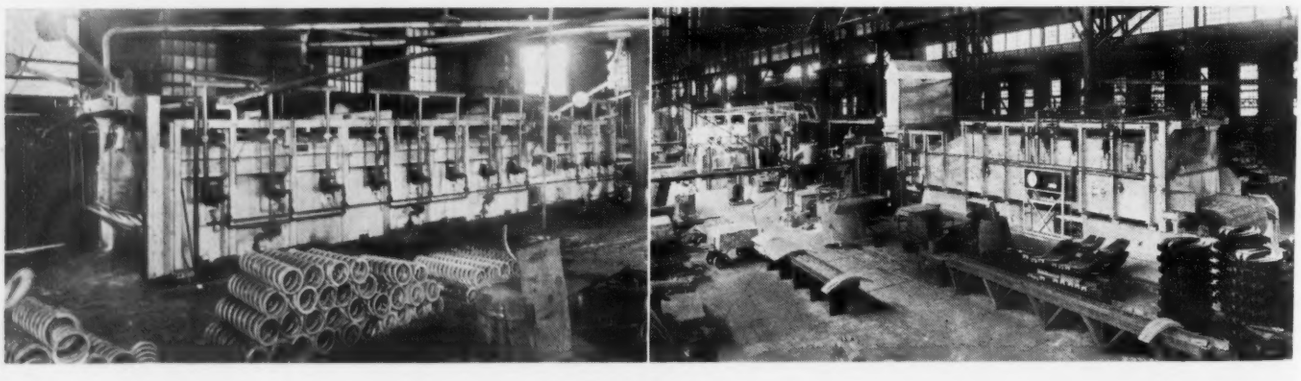
Requirements of this application were that in a minimum time, material was to be heated to a temperature of approximately 1650 to 1750 degrees, depending upon the particular material involved. At the same time, amount of scale formed had to be kept at minimum and bars heated to temperature uniformly. Fig. 1 illustrates a furnace of this type used to heat spring bars prior to coiling.

Burner equipment consists of a soft-flame type of burner equipped with air-gas ratio control. A large number of relatively small burners are used so heat distribution along furnace hearth is uniform from end to end. Atmosphere in furnace is determined primarily by air-gas ratio control. This is set to maintain a ratio between air and gas at a point which experience indicates produces best surface on the finished product. Dampers at intervals along furnace permit flue gases to be exhausted.

After springs are formed, it is necessary to reheat them for the oil quench. Previous practice consisted of quenching from forming heat, but frequently springs cooled below the critical point prior to quenching, producing non-uniform results. More uniform springs are produced by reheating and quenching in the proper medium from this heat-treating furnace.

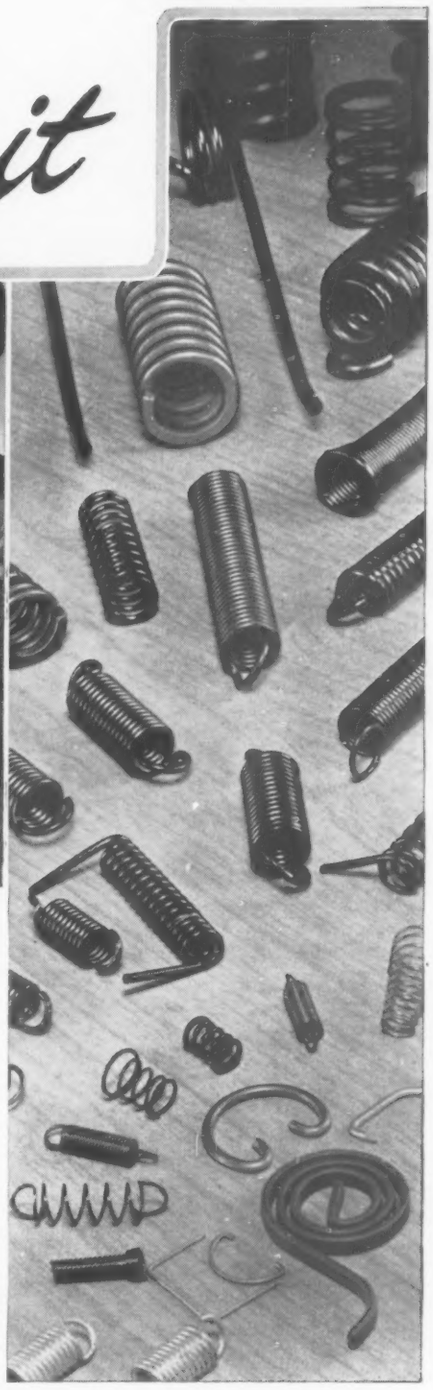
Fig. 2 illustrates a continuous type of heat-treating furnace used successfully with coil springs. It also has automatic air-gas ratio control

Fig. 2—Continuous type heat-treating furnace heating bars prior to quench



ADVERTISING PAGES REMOVED

If the spring you need has never been made...



TELL us what the spring must do and we will provide you with American Quality Springs that will do the job the way you want it done. For if we do not already make a spring of the type you need, our engineers will design a spring that will answer your problems.

American Quality Springs can be depended upon to give the kind of service for which they are intended. They resist fatigue . . . hold their shape and give additional life to your product, because they have the quality behind them that has been developed in more than a century of experience in the manufacture of wire products. No matter what type of springs you need, we can supply them . . . for we produce every type and size of compression, extension, torsion and flat springs in common use.

Many manufacturers have found that a distinct improvement in their products has resulted from using American Quality Springs. And many manufacturers have discovered that our engineering department can be of real help in solving their unusual spring problems. Why not put it up to us? A letter or a telephone call will get immediate action.

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

and automatic temperature control so furnace atmosphere is held at desired point and temperature is controlled, enabling springs to be treated at right temperature for the steel from which they are made.

Drawing Relieves Stresses

After quenching, springs are placed in a draw furnace to relieve any internal stresses or brittleness caused by quenching. Drawing is done at temperatures ranging from 500 to as high as 1100 degrees Fahr. This operation is the last heat treatment given the springs and it is important that the drawing temperature be regulated within close limits because this treatment determines to a large extent the final hardness and characteristics of the springs. At the same time it is necessary to heat the material at a rather rapid rate to keep in step with plant production requirements.

For operating at these comparatively low temperatures, it has been found advantageous to use a furnace equipped with a recirculating type of air heater. Fuel is burned in a separate chamber and products of combustion are mixed with air from a fan which lowers their temperature to desired point and rapidly circulates the hot gases through the charge of material being treated.

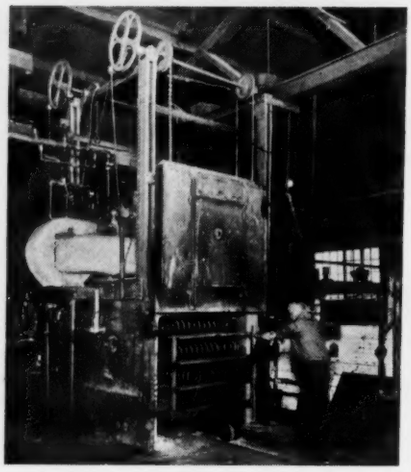


Fig. 3—Batch type recirculating furnace also used in drawing springs

Heat is transmitted to charge by convection, conduction and some radiation, although radiation is relatively small at these low temperatures. After passing through charge, gases return to fan inlet and are recirculated. A minimum amount of heat is lost. This type of firing is adaptable to either continuous or intermittent type furnaces.

An intermittent furnace is illustrated in Fig. 3. Some of these intermittent furnaces have been equipped with reversing valves which change direction of flow of the hot air stream at about two-minute intervals so maximum amount of temperature uniformity is obtained. Once these ovens have attained temperature, tests indicate temperature differences throughout air stream are practically nil, showing that work is approximately at heat and that the hot gases passing through the oven are losing little heat in their progress.

Motor Manufacture A Difficult Handling Problem

■ **At least 20 different types and sizes of rotary electric machines are seen in this illustration, indicating some of the materials handling problems involved in modern electric motor manufacture. Jib cranes, overhead hoists, monorails, roller conveyors, etc. are used throughout this plant. Photo courtesy Reliance Electric & Engineering Co., Cleveland**

Nickel Alloys Protect Paint in Manufacture

■ Tests to determine what metals offer best protection to color and clarity during manufacture of paints and varnishes were described recently by R. T. Barnes Jr., research metallurgist, International Nickel Co., New York, at the fall meeting of the American Chemical Society, Milwaukee. Rates of corrosion for nickel, monel and inconel were found sufficiently low to qualify for such applications.

New Cutting Oils

■ Announcement of a new series of soluble cutting oils has been made by E. F. Houghton & Co., 240 West Somerset street, Philadelphia.

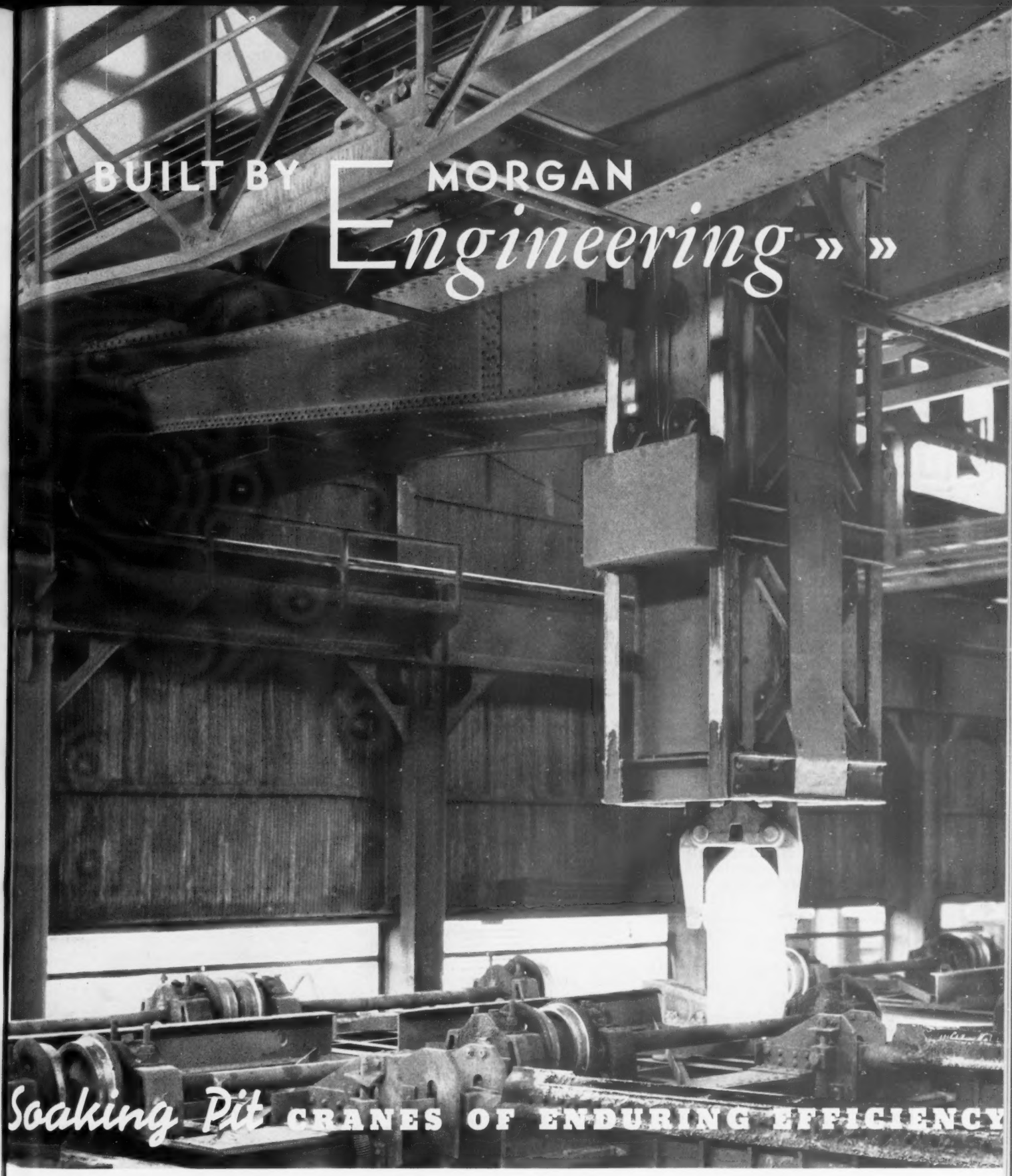
It is claimed these oils will not break down, even under boiling conditions. They contain no volatile materials to evaporate off. Oils are self-emulsifying, mix immediately in cold solutions, and are free from gumming. Rust preventatives and rapid wetting out agents have been added in the manufacture of these cutting oils, adding definitely to tool life.

Clean Metal Surfaces

■ Announcement of two new products has been made by Nielco Chemical Co., 5411 Cicotte avenue, Detroit.

Prepared for use on new or old galvanized metal, zinc diecastings or other metal containing a large percentage of zinc, Galvo-Cleen is designed to clean and prepare surface for painting. It produces a good bond for paint and presents a non-reactive zinc phosphate coating.

Recommended for removing corrosion from metal surfaces, Rust Solv, a semipaste solvent, can be used on chromium, brass, copper and steel. It is of the same consistency as paint and adheres to brush as well as to surface to which it is being applied, thus eliminating waste by dripping.



● In over 55 years of experience, Morgan Engineering has had the opportunity to observe, eye-to-eye with its customers, the actual lifetime of the huge machines required in making steel. Longevity of service life is of course predicated upon sound engineering, the best materials and correct fabrication methods. Morgan cranes 40 years old and over are in operation today—slower, less efficient than a modern Morgan crane of latest type—but still operating with their original responsibility. Here is a Morgan 10-ton, 73′6″ span, modern Soaking Pit crane in an Ohio steel mill, equipped with worm-operated trolley and anti-friction bearings.

★

★

★

★

★

DESIGNERS • MANUFACTURERS • CONTRACTORS

Blooming Mills • Plate Mills • Structural Mills
Electric Traveling Cranes • Charging Machines
Ingot Stripping Machines • Soaking Pit Cranes
Electric Welded Fabrication • Ladle Cranes
Steam Hammers • Steam Hydraulic Forging
Presses • Special Machinery for Steel Mills

THE MORGAN ENGINEERING CO.,
Alliance, Ohio

Pittsburgh, 1420 Oliver Bldg. • New York, 11 W. 42nd St.

★

Transformer Tanks

Operations involved in fabricating round type distribution transformer tanks were cut in half. The basic plan was similar to that used in steel barrel industry

By S. W. CHANTLER
General Foreman, Sharon Works
Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

■ IN THE MANY years Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been fabricating pole-type distribution transformers, the practice of square corners and welded bottoms was generally adhered to, although in some instances the design took the form of a hexagonal or cruciform shape. This practice reduces the amount of oil required to a minimum, which helps decrease the weight, and provides considerable surface for cooling the oil.

The walls of the cases were made in two pieces joined together by two seams, and the bottom welded into place. The cover or upper part was necessarily the same shape as the case. It was made by deep drawing, using steel of high drawing quality. In producing the cover expensive tools and dies and a number of separate operations were involved.

Fig. 1—New design distribution transformer tank and cover

In addition to the costly tools, it was necessary to spend considerable money in an effort to obtain suitable materials that would work satisfactorily with the tools involved. Handling charges in producing the parts and between operations were expensive. Production of the case wall required quite a number of tools and involved much welding either by hand or with a semiautomatic welder. Also five separate operations were necessary before the wall was ready to be joined to the bottom. Fabrication of the square tank thus took anywhere from 25 to 30 operations in addition to in-between handlings.

Design Reduces Operations

A newer design, known as the round type, is illustrated in Fig. 1. The tank is produced with only about half the number of operations and with only about one fourth the amount of welding. It is made on a production line unit which is entirely self-contained and which partly eliminates feeder departments previously used, thus speeding production. Altogether the new form presents simplification from the standpoint of production, shipping and customer use.

This job has introduced into the transformer business some new manufacturing ideas and methods.

Fig. 2—Sheet steel cylinder for wall proper being formed in a pyramid roll in one pass

As the basic plan, the manufacturing procedure used in the steel barrel manufacturing industry was followed.

The tanks are cylindrical in shape and range in diameter from 10 to 30 inches. Height of the units varies from 18 to 60 inches. Steel used in side walls, bottom and cover ranges from 0.078-inch to 0.125-inch in thickness. Material is gas annealed to obtain the best results in joining the two ends of the cylinder and in the resistance welding of parts attached to the wall of the tank. Use of this material eliminates shot blasting or otherwise processing for welding. In addition it is finished with a cold pass.

Wall proper is a sheet steel cylinder formed in a pyramid roll in one pass as illustrated in Fig. 2. The bending roll utilized is one of standard manufacture to which an elec-

ADVERTISING PAGES REMOVED

tor has been added. This ejector is made in such a way that it throws the completely rolled wall clear of the machine, preventing a sheet that has been rolled from passing through the machine a second time.

The operation in producing the wall is to flash-weld the two ends of the rolled cylinder together. This operation is used extensively in the steel barrel and automobile industry, and after considerable development has proved to be satisfactory in the production of this type tank. The greatest problem connected with the flash welding of tanks was to remove the flash from the seam of the tank economically and effectively and yet satisfactorily for electrical requirements dictate that there shall be no particles of steel adhering to the interior walls of the tank. This was solved through use of a flash-trimming machine which removes the flash automatically.

Made Oil-Tight

To make the transformers oil-tight, a unique method is used to obtain a gasket surface suitable for the requirement at one end of the welded cylinder. The surface used is illustrated in Fig. 3 which shows the side wall of the tank curled over into a semicircular flange. This operation is performed by placing the welded cylinder into a press and, with the use of a forming die, curling the material over to the required section. Simultaneously, as the gasket surface is formed, the bottom end of the cylinder is flanged out 90 degrees to the center of the wall in order to provide material for mechanically folding the bottom of the tank into the cylinder wall.

The next operation is to attach the necessary parts, such as hanger lugs, grounding bolts, brackets and centering lugs, to the tank wall and bottom. These parts are attached by projection welding instead of welding by hand. The machines used for this procedure are unique because through the use of Rectigon control it is possible, in addition to securing a weld, to transmit forging pressure at the right moment to make sure the parts are definitely attached and made a part of the tank to which they are welded. Welding machines are all equipped with indexing or locating fixtures so parts welded to the tank are properly located before welding; this eliminates necessity of hand layouts. The locating point lines up with the coincidental line on the index plate or fixtures on the welding machine,

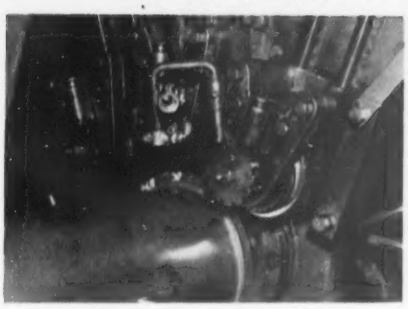


Fig. 4—Close-up view of operation in testing joints

with result all parts are welded to the tank in correct relation to that particular point.

Attaching the bottom to the tank is an operation that is new in the transformer industry. A method of "rolling-in" the bottom has been adopted; this does away with welding on this part and eliminates oil leaks. A cross section of the bottom as it is attached is shown in Fig. 3. As previously mentioned, the cylindrical tank wall is flanged to allow material for this rolling process and to allow a similar amount of material on the detail part for making the tank bottom. These parts are then placed in a double seaming machine and through the use of roller dies the extra material in the wall and in the bottom are rolled together to form a joint. This method looked impractical to those who were welding minded, but experience has shown this operation is successful in producing an oil-tight joint without the difficulties and extra expense involved in welding. Joints are tested at 15 pounds pressure per square inch and less than one leak per 100 tanks was found after this procedure had been adopted. A closeup view of the operation is shown in Fig. 4. Operations performed on the tank from this point on are similar to those commonly used and need not be discussed in detail.

In the development of this type tank, it was found advisable to discard many long-established shop practices and to try new processes that had been proved in other industries. Results have permitted the manufacture of a better product with some saving in cost, and have allowed quicker deliveries.

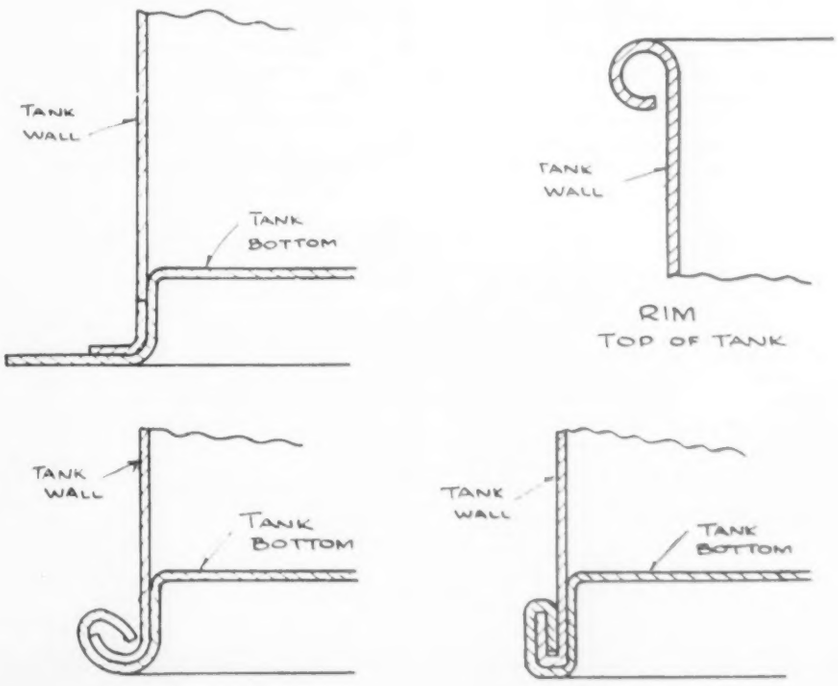


Fig. 3—At right is a cross section of gasket surface and at left is shown the cross section of bottom as formed in machine illustrated in Fig. 4

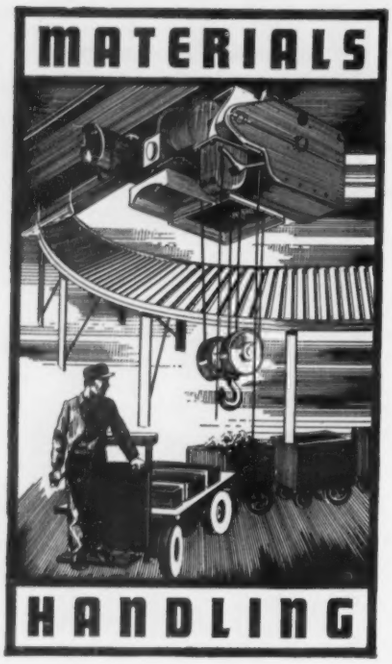
Film Permits Spatter To Be Removed Easily

■ "Spatter film," a compound which is said to reduce cleaning time after welding by 20 ot 60 per cent, has been introduced by Lincoln Electric Co., Cleveland.

The compound has been developed to increase the economy of electric welding as a process of manufacture and fabrication, economizing by reducing the tendency of spatter to adhere tightly.

The product is soluble in water, noninflammable and contains no free alkali to injure the hands or the finish of the piece. It is applied by means of a paint brush, only enough film being used to cover the work adjacent to seam or joint.

A gallon of the compound will cover appropriately 50,000 square inches. When still wet the compound can be removed by wiping off with a cloth, or washing with water when dry.



Bus Fabrication

New plant features assembly jigs, aluminum-hardening oven, automatic parts-cleaning system. Extruded aluminum sections eliminate 1500 parts. These and high-tensile alloy steels cut weight 2000 pounds

■ A LARGE share of the $2,000,000 modernization program recently completed at White Motor Co., Cleveland, went into construction of a new fabricating plant to build huge 40-passenger coaches. Twelve-cylinder, underfloor type engines are employed. About 2000 pounds is saved in this type of bus by use of all aluminum bodies with sideposts and underframes of light weight, high-tensile alloy steel.

An unusual feature is the extended use of extruded aluminum sections for such parts as wainscoting strips, supports for sidelining, card racks, window sills, etc. Thirty extruded shapes are employed, eliminating about 1500 parts formerly required. These extrusions are aluminum alloy XF51ST for strength. Type XF51SW alloy also is used for strength members and belt panels, with 4S¾ hard for girders and sides and 2S for moldings where no structural strength is required.

Door panels are made of 3S¾ hard, straight sheets are 4S aluminum alloy, 52S is used for formed sheets, 51S for the roof structure and a stabilized 52S alloy for the rivets. Comparatively little welding is done except on the 4S and 52S alloys, riveting being mainly employed. Wherever joints are welded, as in making certain fender and other parts, the weld is hammered to bring back some of the original strength by cold working. Material for underframes and body sideposts is Corten, Yoloy or Republic Double-Strength.

Follow "S" Route

As will be seen in Fig. 2, assembly and finishing operations are handled in a path roughly resembling the letter "S". Shearing, bending, forming and welding operations are performed in the basement gallery underneath part of the main floor and connected by a ramp. Stocks of special aluminum sheet, rolled forms and special extrusions also are carried in this section of the plant.

Gallery has a full complement of shearing, forming and welding equipment including a 750-ton shaping press which is 14 feet between housings and has an 8-inch stroke; a similar press rated 380 tons, 10 feet between housings, 4½-inch stroke; a 14-foot trim shear with a capacity up to ¼-inch mild steel and using electric hold-down; various forming rolls; and several types of spot and arc welders. Spot welding is employed only to hold assemblies in position prior to riveting into the main coach body.

Material in process starts from the stock room near north end of gallery, proceeds south through various forming and fabricating operations, is trucked to main floor and

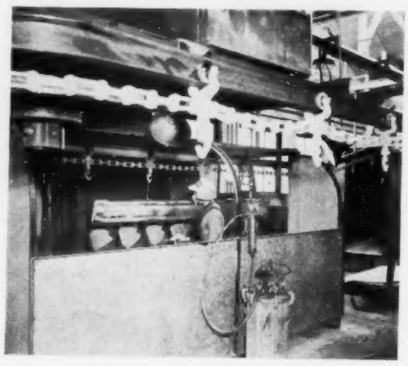


Fig. 1—Parts coming from automatic cleaning system receive priming coat here

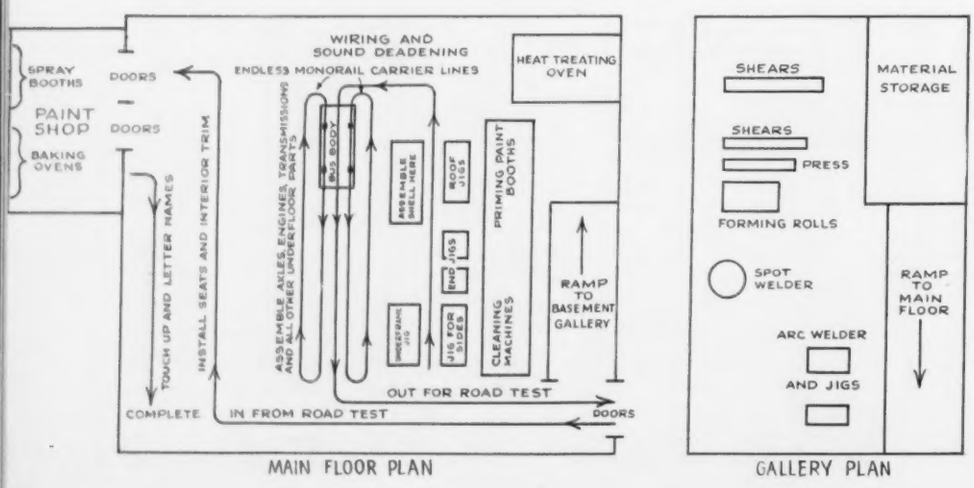
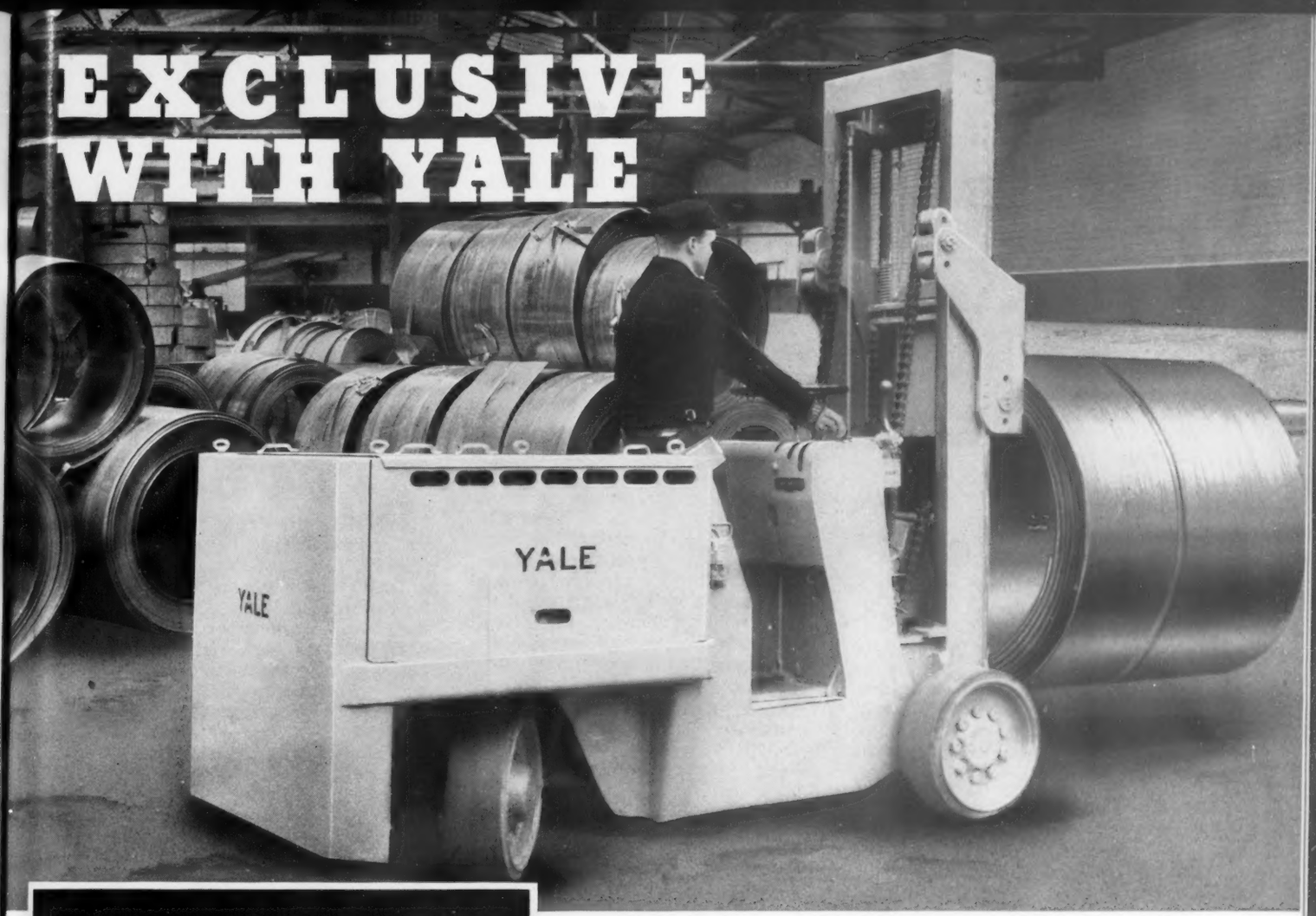
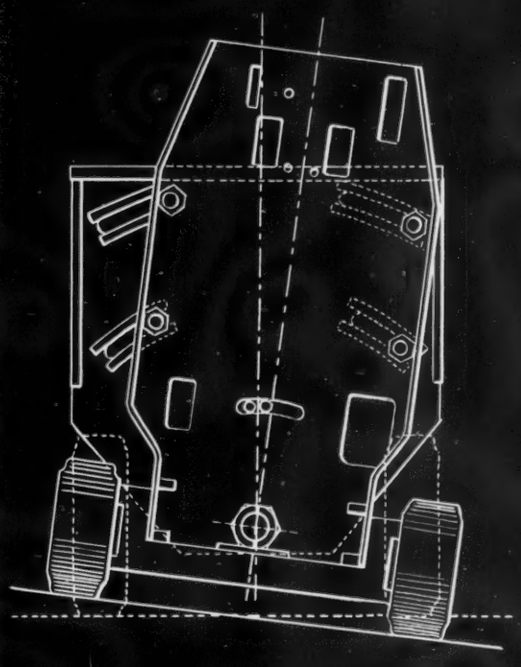


Fig. 2—Layout of new coach plant of White Motor Co., Cleveland. Not complete or to scale

EXCLUSIVE WITH YALE





Diagrammatic view illustrating the "Caterpillar Action" of the New Articulated Yale Ram Truck — Just another economy feature that is Exclusive with Yale.

ARTICULATED RAM TRUCKS!

One year ago at the last convention of the A.I.&S.E. we used this same illustration and headline to drive home an important Yale fact—a fact that still holds true today . . . Yale brings you the latest in advanced engineering design.

The Articulated Ram Truck for example. In one short year fleet installations of this type equipment have been made by leading strip mills throughout this country, as well as in the most modern continuous rolling mill operating in England today.

Naturally, there's a reason. Revolutionary in design—the chassis is constructed in two units with the fore and aft sections rotating on a massive king pin. This provides a "caterpillar action" that makes it possible to operate over the roughest floors without fear of torsional strain, providing perfect traction at all times—eliminating twisted frames—and above all, keeping all four wheels on the ground under *any* operating conditions . . Safety *Plus*!

In addition there is Yale Power Steer of the follow-through type. Regardless of how heavy the load, the slightest pressure in the direction desired on the steering or control lever, brings a corresponding movement and position to the steering wheels. No jerking of lever is ever necessary.

Also, Balanced Spur Geared Power Units provide 20 to 30 per cent greater ton miles per K.W. energy, while the *exclusive* Yale Cam-O-Tactor brings to your operations the benefits of a mechanically cam-operated contactor controller. This provides smooth and positive action free from the sticking and welding of contact points so common to magnetic contactors. Add all of these factors together and you get maintenance economy that cannot be matched in the field today . . A dollars and cents reason for buying Yale!

YALE MARKED IS YALE MADE

TRADE YALE MARK

THE YALE & TOWNE MANUFACTURING COMPANY,
PHILADELPHIA DIVISION, PHILADELPHIA, PA.
IN CANADA: ST. CATHARINES, ONT.

loaded on conveyor going through the cleaning equipment. This conveyor travels 56 inches per minute, taking the aluminum parts first through a hot alkali solution, one ounce to the gallon, maintained at 160 degrees Fahr.

Parts Neutralized

Next parts go through a cold water rinse. Then they are neutralized in a solution of 0.1 per cent phosphoric per gallon at 160 degrees Fahr. Following this, they are dried by a hot blast of recirculated air. Emerging from the drier, the parts are given a spray of zinc chromate primer. This is really a double coat as the operator puts on one layer making horizontal passes and then makes vertical passes assuring even coverage and actually depositing two layers of paint.

Heavy material for curved parts such as corner pieces, rafters, side letter boards and rear belts must be received in the plant in a soft condition so it can be formed properly, yet it is desirable that these pieces be hard when assembled. Such parts are made of aluminum alloy XF51SW. After forming and blanking, they are heat treated in the special furnace shown in Fig. 3. The aging treatment used consists of maintaining a temperature of 325 degrees Fahr. for 16 hours. This increases the yield point to approximately 45,000 pounds per square inch and practically doubles the ultimate strength—all without warpage or distortion, it is said.

Heat-treating oven is 16 feet long, 12 feet wide and is heated by a direct gas-fired heater. Controls seen at left of oven in Fig. 3 afford safe and automatic control of temperature. Five sets of thermocouples are placed in the load so temperature records can be taken at various points. An air-operated temperature controller and recording potentiometer with control devices act to hold temperature within 2 degrees of the figure set. Following heat treatment these parts go through the same cleaning and priming operations described above.

Assembly of parts is handled on a number of jigs. Side member assembly jig and underframe assembly jig are seen in Figs. 4 and 5.

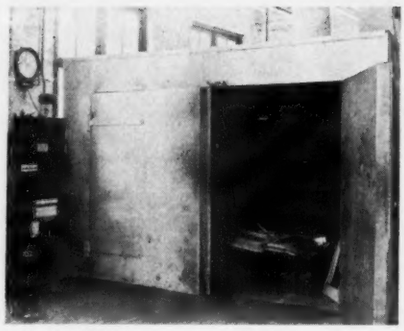


Fig. 3—Heat-treating oven for aging aluminum alloy parts

Fig. 6 shows the roof panel jig at left and two completed panels at the right. These jigs are made of standard structural angle and channel sections welded together and bolted to the floor. Side member jig in Fig. 4 accommodates both right and left hand assemblies. Guide pins and locating holes are used in positioning members in these jigs. Hand clamps are widely used to hold parts in subassemblies. Ends of bodies are likewise assembled on a special jig.

After these assemblies have been made up, the underframe is placed on a master jig a little above floor level. Side, ends and roof are then placed in position by hand and riveted together to form the bus body. It now has reached the end of the first assembly line and still is so light that a few men can easily lift it and place it as desired. The floor of wood is assembled into the shell next.

Body Soundproofed

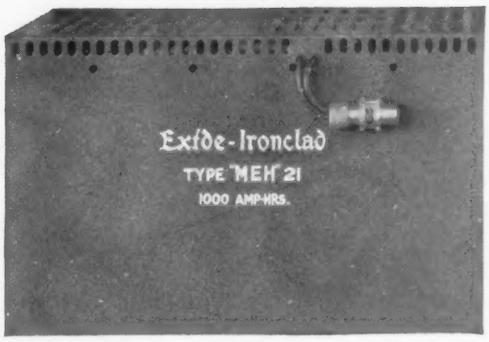
At end of this first line, all the electric wiring is put in and bus body receives a coat of sound absorbing material on inside of all top, side, and end surfaces to eliminate metallic body noise and drumming.

Fig. 7 shows appearance of these surfaces with the cork and asbestos coating applied. Completed shell assembly now is placed on four supports hanging from monorail carriers as shown in Fig. 8. These supports fit inside the four wheel housings and permit moving the entire shell down the second line as desired.

This second line, or middle part of the "S" path, is where the power plant, axles, transmission and other drive units are put in place. Wheels, control units, gas tanks, etc. also are assembled into the bus here. Bins are used to hold parts being assembled in this line. The men work

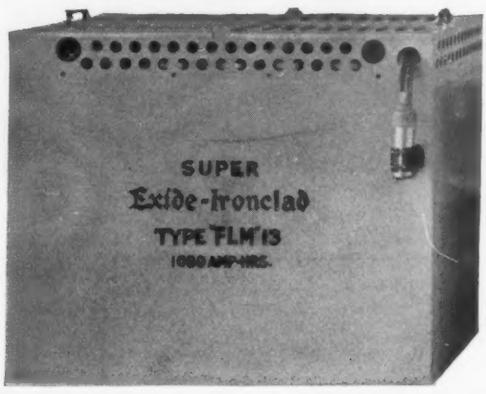
Fig. 4—(Top)—This is the welded structural steel jig used in assembling the side panels. Fig. 5—(Bottom)—The underframe for the coach is assembled and riveted together on the jig shown here

There is an Exide-Ironclad Battery to fit any size truck . . .



Exide
IRONCLAD
BATTERIES
With Exide MIPOR Separators
"MIPOR," Reg. U. S. Pat. Off.

See these Exide-Ironclads at the Iron and Steel Exposition, Cleveland, Ohio, Booth No. 117



To mark the fiftieth anniversary of Exide Batteries, a handsome souvenir booklet has been prepared illustrating the essential part these batteries play in daily life. Write, and we will gladly send you a free copy.

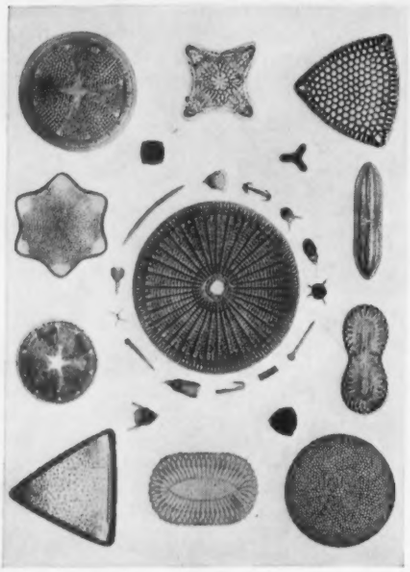
THERE is an Exide-Ironclad Battery not only to fit the largest size electric industrial truck, but to drive that truck with power to spare in the hardest and heaviest material handling service for which the truck is fitted. And large, modern battery electric trucks are fitted for really tough jobs. They are available in 30,000 pounds capacity and more.

Down the scale from these giants range the thousands of smaller trucks that have become an indispensable part of industry. For these, in their various capacities, Exide-Ironclads also offer ample power for every job. And in each case, you will find that Exide-Ironclads assure continuity of service, long life, and overall economy that make material handling a low-cost instrument of production.

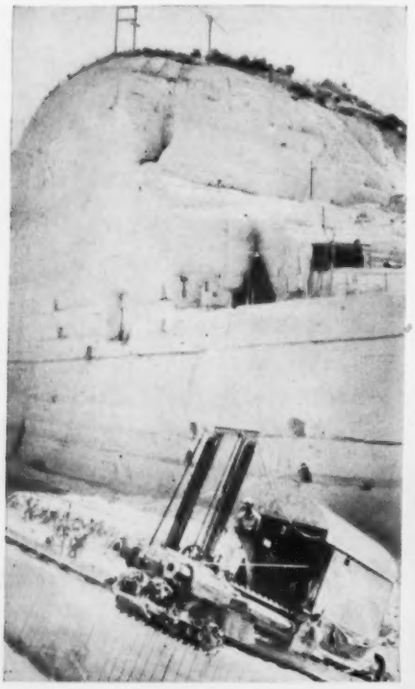
Why not let these batteries improve your material handling service and cut costs? Write for new edition of free booklet, "The Efficient, Economical Method of Handling Material."

THE ELECTRIC STORAGE BATTERY CO., Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

HOW TINY SEA PLANTS SAVE INDUSTRY MILLIONS OF DOLLARS EVERY YEAR



1 Under the microscope, diatoms present an amazing variety of intricately beautiful designs. Each is the skeleton of a complete single-celled organism that lived and died about 50,000 centuries ago. Settling to the ocean bed, these tiny plants built up a vast deposit of diatomaceous silica . . . one of the most efficient high-temperature insulating materials known today.



2 The Lompoc deposit of diatomaceous silica in California, owned by Johns-Manville, covers an area of five square miles and is 1400 feet deep. High-temperature insulations for many of the world's largest utilities and industrial plants have come from this chalklike cliff. More than 100 million tons of Celite are included in the deposit, the largest and purest ever discovered.

NEAR Lompoc, California, lies a vast deposit of Celite . . . one of the most useful substances known to man. Geologists call it "diatomaceous silica." It is porous, has a chalklike appearance and is unusually light in weight. Look at some of the powder under a powerful microscope and you will see what it really is . . . a mass of minute skeletons of tiny sea plants that lived and died millions of years ago when California was part of the ocean floor.

Up to about 1900, these tiny organisms served no useful purpose. Their peculiar properties were unknown . . . the need for them had not been developed. But with the increasing demand for more efficient industrial insulating materials, Celite soon was put to work. Tests showed that, because of its enormous number of dead-air cells and the high heat resistance of its silica composition, Celite was a far better insulating material for high temperatures than any substance previously used.

Today, Johns-Manville manufactures Celite into the well-known Sil-O-Cel materials—Sil-O-Cel Natural, C-22 and Super Brick, Sil-O-Cel Powder, and Sil-O-Cel C-3 Semi-Refractory Insulating Concrete. And, when bonded with asbestos fiber, Celite is also made into the widely used Superex Insulation for high-temperature industrial furnaces and superheated steam lines.

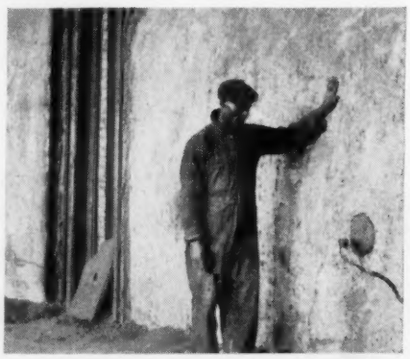
These and other J-M Insulations are now used wherever high temperatures are used in industrial processes. By preventing heat waste, they save industry many millions of dollars a year. The complete story of the remarkable strides made in controlling heat during the last 25 years is told in J-M's interesting handbook, "Heat." For your copy, and complete information on the full line of J-M Insulations for all industrial purposes, write Johns-Manville, 22 East 40th Street, New York, N. Y.

JOHNS-MANVILLE JM PRODUCTS

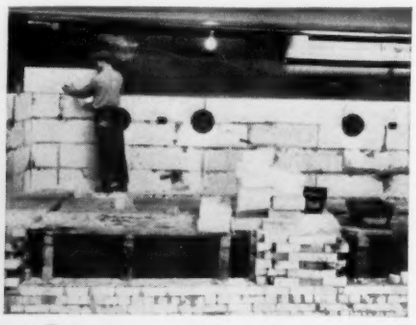
JOHNS-MANVILLE

INSULATIONS FOR EVERY TEMPERATURE . . . FOR EVERY SERVICE CONDITION

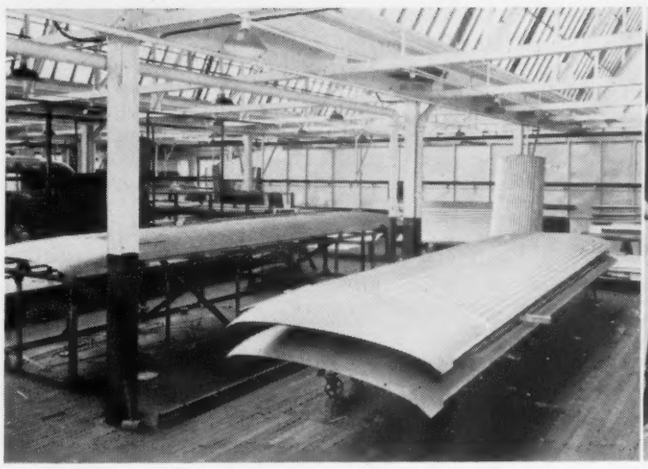
3 One cubic inch of Celite from the Lompoc deposit contains as high as 75 million separate diatoms. This explains its exceptional insulating efficiency, as the resistance of any material to the flow of heat depends directly on the number of separate surfaces per inch of thickness. Johns-Manville makes this remarkably efficient insulating material into many different forms to meet every industrial requirement. This strip-annealing furnace is being insulated with J-M Sil-O-Cel C-22 Brick.



4 Made into semi-refractory insulating concrete, Celite is used for furnace bases and door linings, baffles, dampers, etc. Sil-O-Cel C-3 Concrete, shown here, is over three times as effective as fire-clay brick in reducing heat transfer . . . needs no other refractory protection against direct temperatures as high as 1800° F.



5 Bonded with asbestos fiber, Celite is formed into J-M Superex Blocks, being used here to insulate a soaking pit in a large Eastern steel mill. Superex, also manufactured in pipe-covering form, is recognized as the outstanding insulation for superheated steam lines, boilers and high-temperature industrial furnaces of every type. There is a J-M Insulation for every industrial requirement.



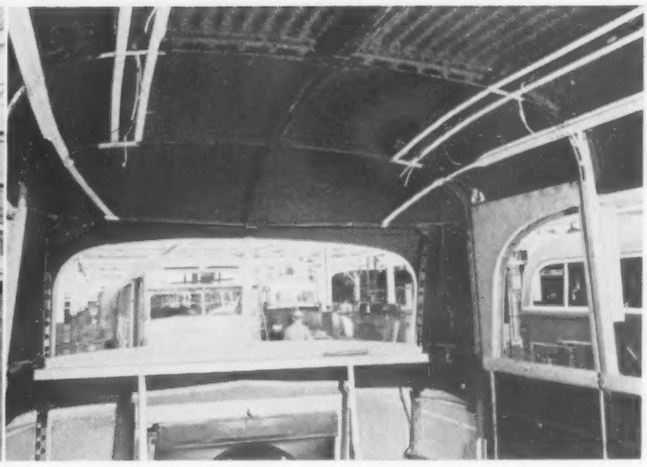


Fig. 6—At extreme left is jig for assembling the roof sections and several completed roofs are seen stacked at the right

Fig. 7—Inside of coach shell showing appearance of inside surfaces of outer metal shell after spraying with a cork and asbestos composition as a sound deadener

on small dollies provided with wheels which turn freely about any horizontal axis thus facilitating maneuvering. Dollies serve as seats for the men and also are provided with a number of shelves to hold tools and parts.

At end of this line, the bus is driven off under its own power. Each machine is given a thorough road test at this point to be sure that all drive and control units are operating correctly and adjustments for maximum performance are made at this time.

Finish Applied

Buses now go to the paint shop just west of the main assembly shop as shown in the diagram, Fig. 2. Here are two spray booths and two baking ovens, each one large enough to take the largest coach. Finishing procedure is as follows: All parts of course have the zinc chromate primer applied before assembly, so first final finishing operation on outside surfaces is to clean them and spot prime any places needing it. After this an oil base surfacer is applied and baked 1½ hours at 175 degrees Fahr.

Next step is to rub down and water sand these surfaces. A tack rag then is used to assure absolute absence of dust after which the first spray coat of color is applied. This is baked 1½ hours at 175 degrees Fahr. and the second color coat applied and given a similar bake. Only remaining operation is the touchup and lettering of names on the coach. Synthetic enamel is used and actually each coat consists of two layers as the spray gun operator first makes a series of vertical passes and then horizontal passes. This work is done back on the last or third leg of the letter "S" in the main assembly line where all the finishings, chairs, curtains, etc. are assembled into place.

Prior to this, however, all inside surfaces of the coach receive the following finishing treatment. Inside walls and ceiling are covered with prestboard and the floor with linoleum. Metal surfaces have received the original zinc chromate priming coat and now are cleaned, spot primed where necessary and

(*Please turn to Page* 139)

Fig. 8—Here the engine, transmission and other underfloor parts are mounted. Coach is suspended between two monorail lines by means of carriers fitting into the wheel housings

NEW METAL PRODUCTS

■ A line of six new streamlined cab-over-engine trucks, rated from 12,000 to 23,000 pounds gross, has been announced by Mack Trucks Inc., Long Island City, N. Y.

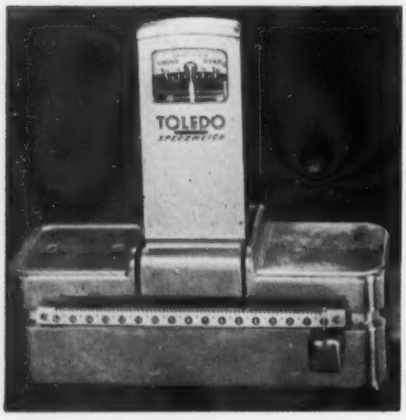
All-metal cab is equipped with safety glass throughout. Engine is set forward within the cab, mounted

conveniently low, and is covered by an insulated sheet steel housing. Chassis accommodates standard body lengths on wheelbases averaging 32 inches shorter than corresponding conventional models. Turning radii and overall lengths are correspondingly decreased. Due to cab-over-engine construction, gross vehicle weight distribution of 1/3 on front and 2/3 on rear has been accomplished.

■ Constructed entirely of steel and weighing 3 tons, a bread pan washing machine of new design has been placed on the market by Industrial Washing Machine Corp., New Brunswick, N. J.

Machine loads and unloads at one end. Pans are placed in trays and then are totally submerged in a tank of boiling cleaning solution. A rinsing spray and drying operation completes the cycle. Using one operator, a machine 11 feet 3 inches long has a capacity of 2100 to 3000 pans per hour.

■ Weighing only one-fourth as much as the model it replaced, a modern over-and-under, or predetermined weight scale of stainless



steel and die-cast aluminum has been added to the line of Toledo Scale Co., Toledo, O.

This scale, known as the Speedweigh, has a 5-pound capacity, and is accurate to 1/64 of an ounce. It has an etched stainless steel beam with special figures and graduations. Housing and platters are die-cast aluminum of distinctive modern design. Lever system is enclosed, and pivots and bearings are tool steel. Offered with this scale is a full line of commodity platters and pans formed of polished cast aluminum and nickel silver.

■ Most recent addition to the Magic Chef line of American Stove Co., Cleveland, is a heavy duty gas range designed for use in restaurants and hotels.

Body of range is Armco stainless steel of 18-8 type, a grade widely

used in food-handling equipment, largely because of its high polish, durability and easy-cleaning qualities. Advantages of range are said to be graceful design, low gas consumption and evenly controlled heat.

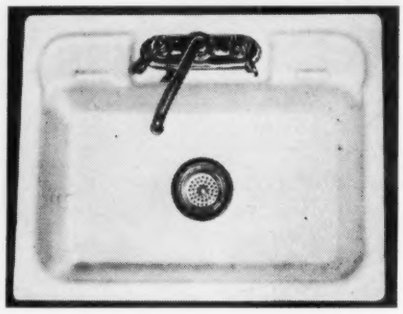
■ A new application of an old principle is found in the use of a universal joint in the rotor of a petroleum pump, manufactured by Granberg Equipment Co. Rotor employs joint in its function between two shafts, set at an angle of 30 degrees between axes.

Components of the rotor are zinc alloy die castings and are ready for use as-cast. No machining is required. All fits are exact, and holes and keyways are cored to final size.

■ A single-compartment, flat-rim kitchen sink of smart, modern appearance has been announced by Ebco Mfg. Co., 401 West Town street, Columbus, O., for installation in metal, linoleum or tile sink tops.

Eliminating wall pipes and simplifying installation, an integral, chromium plated, swinging spout mixing fixture is attractively arranged on back ledge of sink. Self-draining soap dishes are integral with back ledge.

Sink is heavy cast iron finished in white or ivory acid-resisting



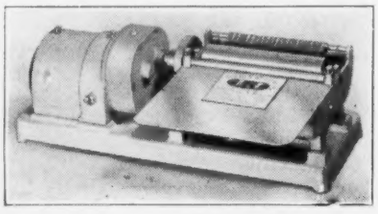
porcelain enamel. Edges are level and straight so that a watertight joint is assured.

■ A simple, efficient brake-actuation system for converting manual brakes into power brakes on trucks, tractors, trailers and other commercial vehicles has been announced by Wagner Electric Corp., 6400 Plymouth avenue, St. Louis.

Designated as Auto-Motive-Air, this system is operated by vacuum available in the intake manifold. It builds up a reserve tank pressure of 100 pounds and over, and automatically comes to a stop when predetermined pressure is reached. It replenishes immediately air spent in operating brakes and operates only when air is needed.

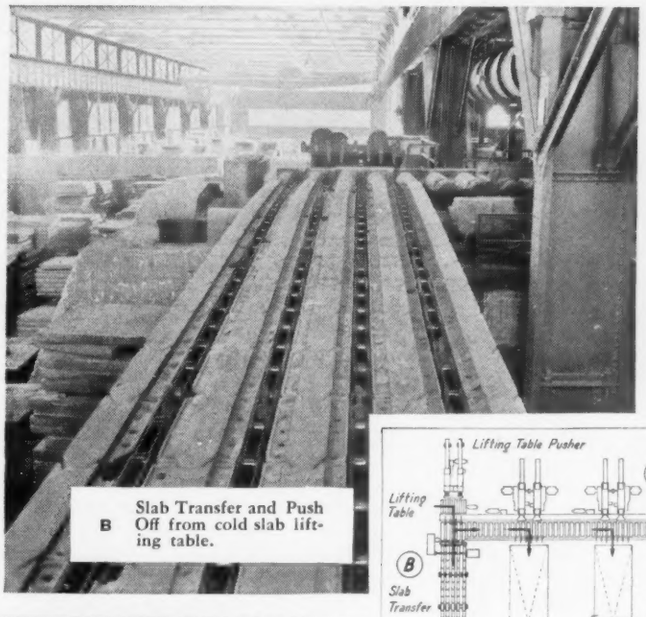
■ Designed for use by bottlers, canners, packers, shipping departments and wherever applied labels are used, a new line of label gummers has been introduced by U. S. Bottlers Machine Co., 4015 North Rockwell street, Chicago.

Machine illustrated is Model F, an all-over label gummer. Furnished

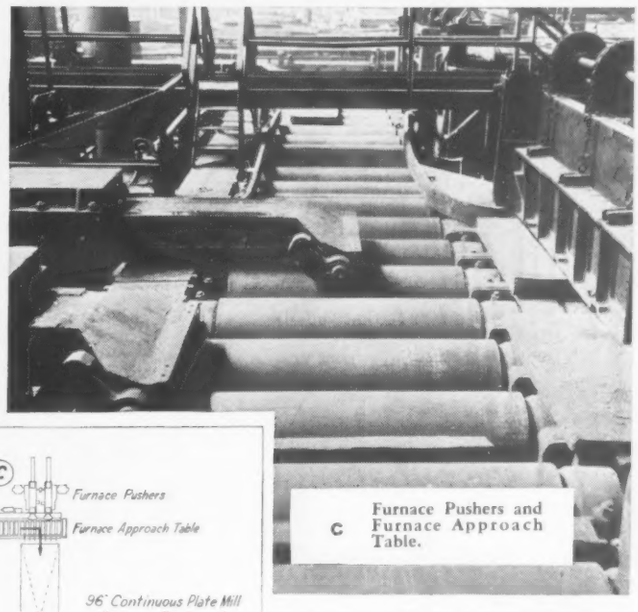


in two sizes, 6-inch and 9-inch, it will apply glue to any length label up to and including these widths. Unit is driven by a fully enclosed, gear-head motor, attached to base. Glue rollers are brass, with bronze bushings.

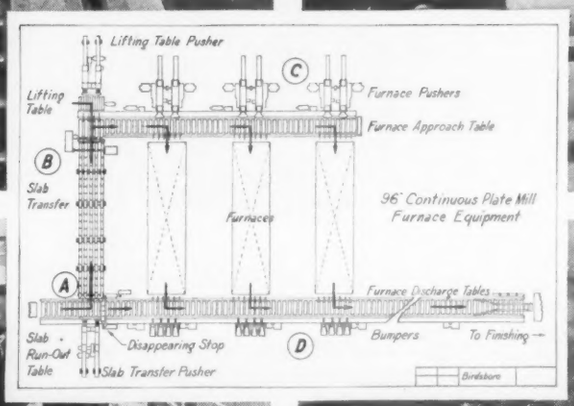
For EFFECTIVE *layouts and* EFFICIENT *engineering of Slab Handling Equipment* ...CALL ON BIRDSBORO

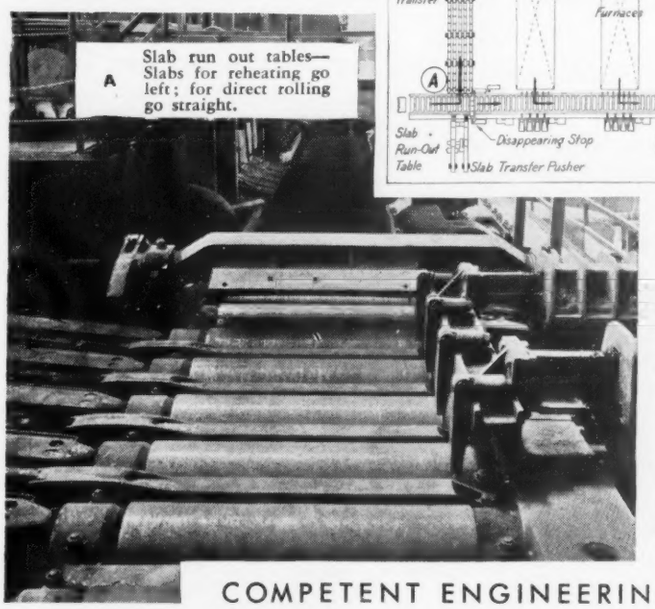


B Slab Transfer and Push Off from cold slab lifting table.

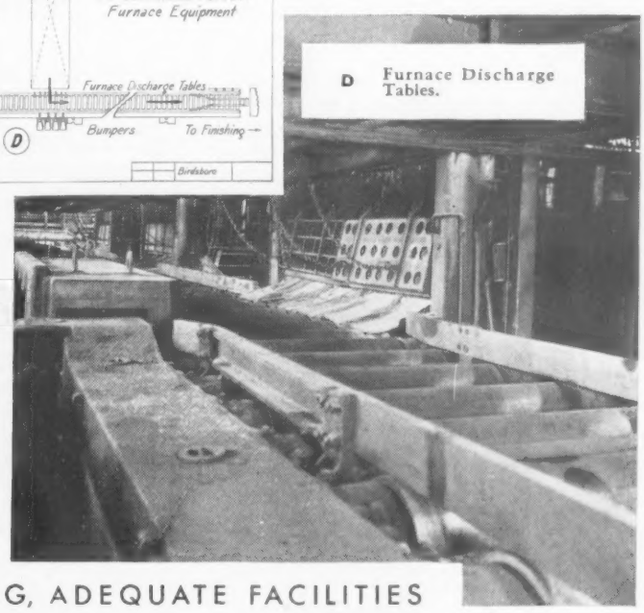


C Furnace Pushers and Furnace Approach Table.





A Slab run out tables—Slabs for reheating go left; for direct rolling go straight.



D Furnace Discharge Tables.

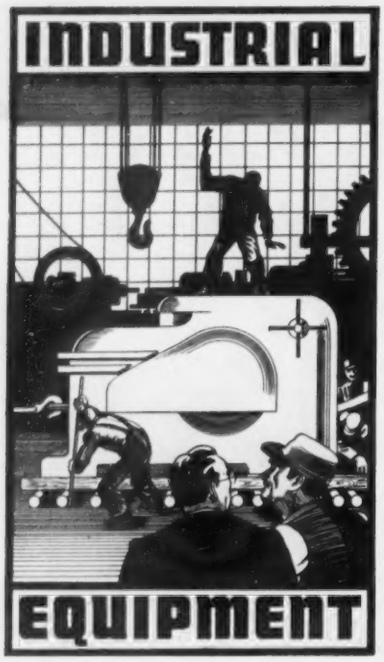
COMPETENT ENGINEERING, ADEQUATE FACILITIES AND 52 YEARS EXPERIENCE WILL BE APPLIED TO GIVE YOU EXACTLY WHAT YOU WANT.

STEEL MILL EQUIPMENT . STEEL CASTINGS . STEEL AND CHILL ROLLS . HYDRAULIC MACHINERY . SPECIAL MACHINERY . CRUSHING MACHINERY

BIRDSBORO

STEEL FOUNDRY AND MACHINE COMPANY

PLANTS AT BIRDSBORO AND READING, PENNSYLVANIA



Power Fork Truck Has Small Turning Radius

■ Wright-Hibbard Industrial Electric Truck Co., Phelps, N. Y., recently has developed a power fork truck, called the Bantam, which is said to be one of the smallest, most compact and efficient trucks yet designed for moving and stacking raw or finished materials.

Overall length of truck with 24-inch forks is 72 inches, and overall width is 26 inches. With a 90-degree swing of trailing wheels truck will turn in a complete circle of 94-inch diameter. Normal capacity of 1000 pounds on forks may be increased by lengthening truck itself.

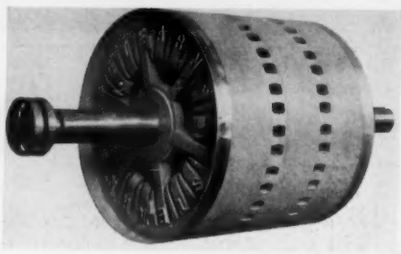
Truck is powered by two railway type motors for traction and lift. All controls are centralized at operator's position between load and battery compartment. Lift forks illustrated are self-engaging type to which boxes are clamped when in elevated position. Many variations of fork design and dimensions are available, however, for individual applications.

Construction of Magnetic Pulley Is Improved

■ Stearns Magnetic Mfg. Co., Milwaukee, has announced improvements in its high duty magnetic pulley, including a new ribbed construction which allows for greater radiation area.

The system of air ducts has been improved. Coil windings are more efficient due to greater cooling area furnished by forced air circulation caused by compressive action of belt. This action forces cooled air into ribbed interior of pulley on upper side and expels heated air by suction on lower side.

Windings are surrounded completely by steel and are fully protected against external hazards. Steel cover plates which enclose



outer diameter are light in weight but have ample strength to carry the belt.

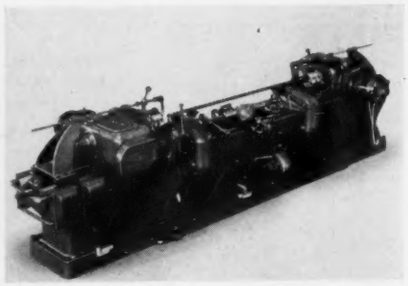
Heavy non-magnetic alloy steel end rings extend beyond active face of pole and are machine fitted to end poles. These rings provide support for unloaded edges of belt at either side and confine magnetic force of pulley to active portion of belt. One-piece magnet body is held firmly in fixed position on alloy steel shaft by heavy steel hubs, welded to supporting arms and keyed in position abutting shoulder of oversize portion of shaft. Special gland type fittings seal lead-in wires against moisture.

Pulleys are furnished in a wide range of diameters and face widths to accommodate any type of existing conveyor system.

Threads Both Ends of Rods Simultaneously

■ Landis Machine Co., Waynesboro, Pa., has added to its line a double-end threading machine, which will cut threads simultaneously on both ends of tie rods, short bars, etc.

Cutting speed of each threading unit is controlled independently by pickoff gear boxes, providing wide variation in spindle speeds. Machine handles bars in diametrical sizes from ½-inch to 2 inches. Minimum and maximum length of bars which can be handled on machine shown in illustration are 4 feet 2 inches and 6 feet 6½ inches, but maximum length can be increased to 10 feet. Maximum travel of threading head units is 22 inches, and a corresponding thread length is obtainable when maximum length bars

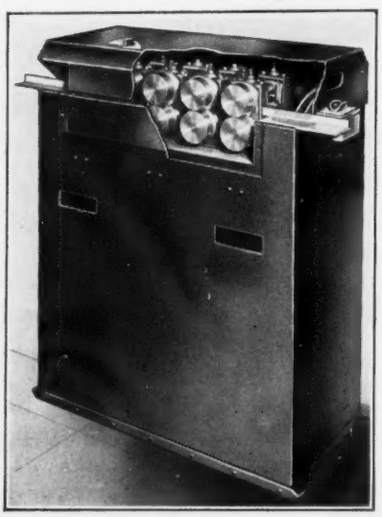


are being handled. Positions of threading head units, gripper jaws and ejector are changed easily for rods of various lengths.

Several movements of the hydraulic system are controllable through separate valves to permit increasing or decreasing functioning speed. An important feature of this system is a special control valve which permits threading units to be advanced under pressure at a definite feeding speed for full length of thread.

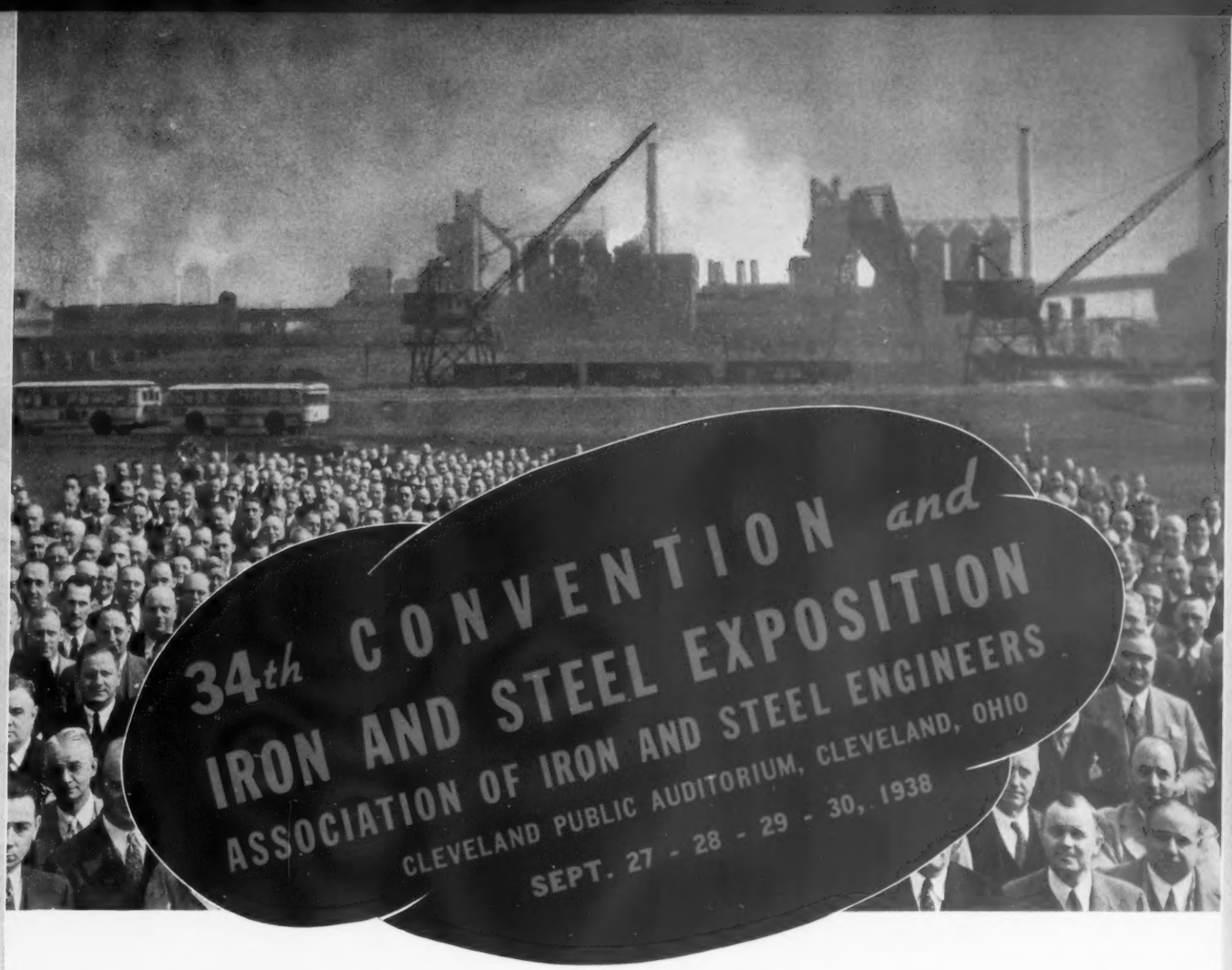
Unit Forms Corner Locks

■ Binklly Machinery Co., Warrenton, Mo., has produced a modernized line of Kor-Ner-Lok forming machines designed to reduce costs and save time in making corner locks for rectangular pipes and fittings for furnaces, ovens, stokers, castings, etc.



Machine is available in three sizes. Smallest model forms up five 8-foot

(*Please turn to Page* 134)

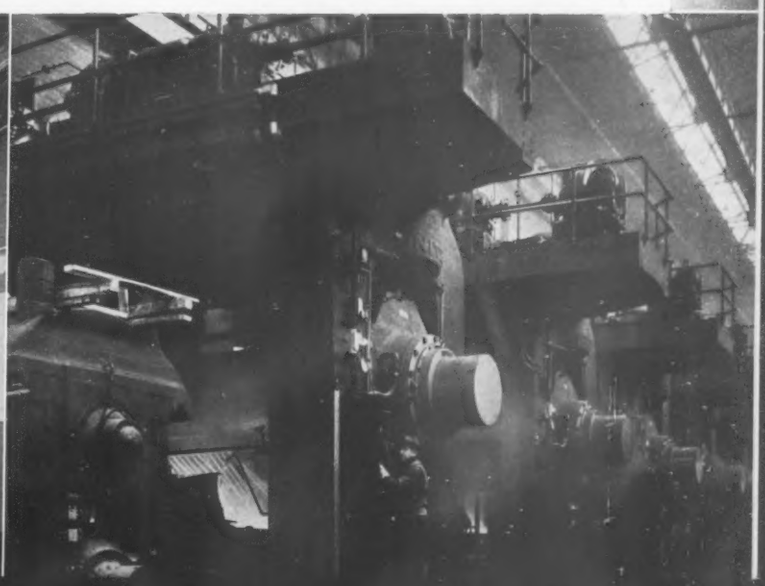

34th CONVENTION and
IRON AND STEEL EXPOSITION
ASSOCIATION OF IRON AND STEEL ENGINEERS
CLEVELAND PUBLIC AUDITORIUM, CLEVELAND, OHIO
SEPT. 27 - 28 - 29 - 30, 1938

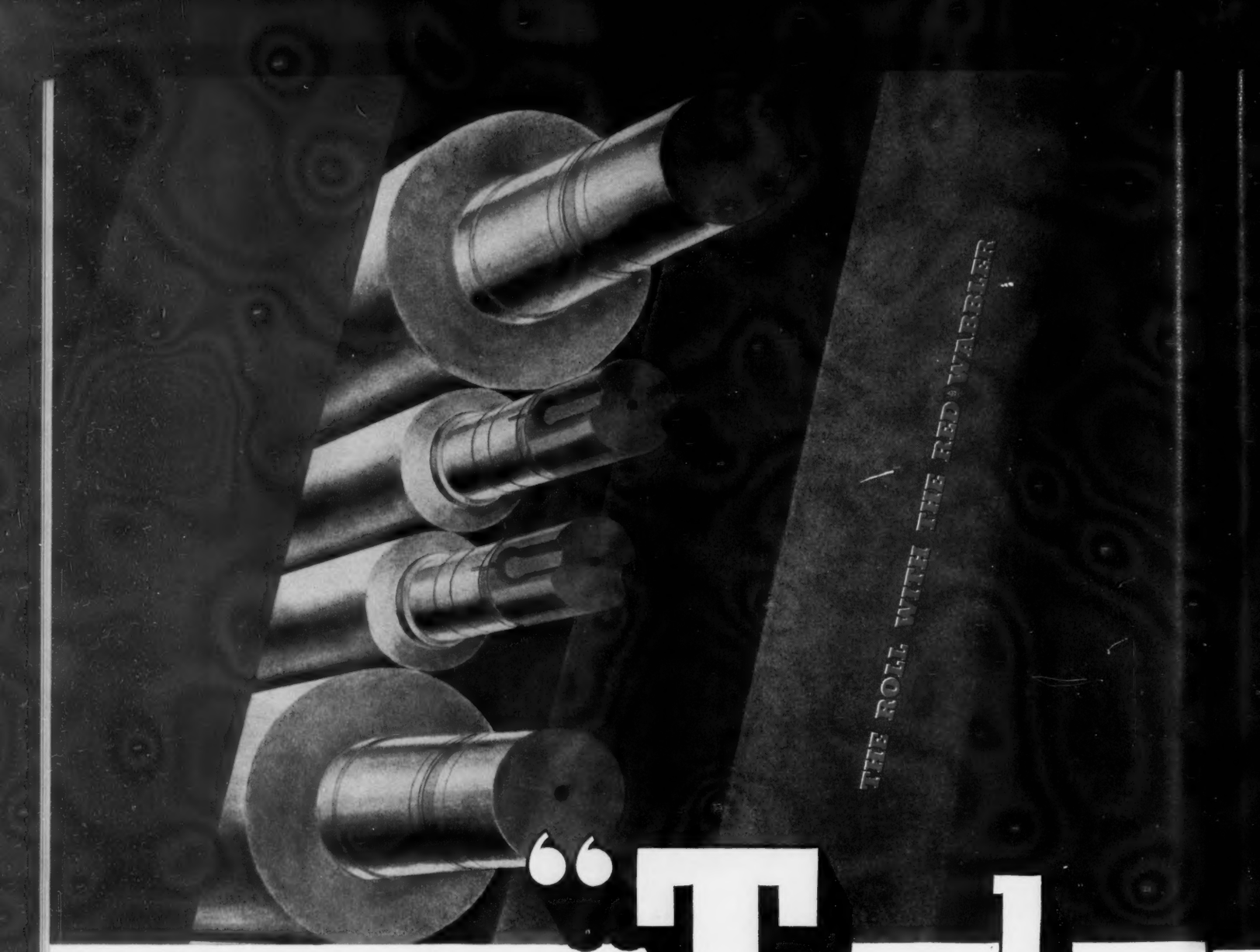
OUTSTANDING EVENTS

1—20 papers dealing with the latest operating methods will be presented at the technical sessions.

2—100 manufacturers of steel mill equipment will exhibit the latest in design methods.

3—Inspection trip to Republic Steel Corporation's new 98" hot strip mill and the Fisher Body Co., Cleveland, Ohio.





THE ROLL WITH THE RED WABBLER

"Techn

ROLLS BY THE "TECHNI" PROCESS

"Technichill" Rolls
"Technigrain" Rolls
"Technisand" Rolls
"Technalloy" Rolls
"Technisteel" Rolls

ALSO

"Techniron" Castings
"Technisteel" Castings

THE "TECHNALLOY" ROLLS ARE:

"TECHNALLOY" STANDARD (minus 1.00% Carbon),

"TECHNALLOY" A. (1.20—1.30% Carbon), and "TECHNALLOY" B. (1.80—2.00% Carbon). All possess greater hardness and strength than rolls of similar composition made under standard practice.

"TECHNALLOY" D. (2.20—2.30% Carbon). For large section finishing and small section intermediates.

"TECHNALLOY" E. (2.40—2.60% Carbon). They have the wearing and finishing characteristics of cast iron, with the strength and shock resistance of steel. For finishing processes, on all sections down to ⅛" thickness.

TRADEMARKED

NEW RECORDS FOR STEEL BASE ROLLS

PATENT APPLIED FOR

nalloy" Rolls

"Technalloy" Rolls have increased strength and greater hardness than similar compositions of ordinary steel base rolls. They have an absolute freedom from blow holes, streaks and spots of impurity segregation.

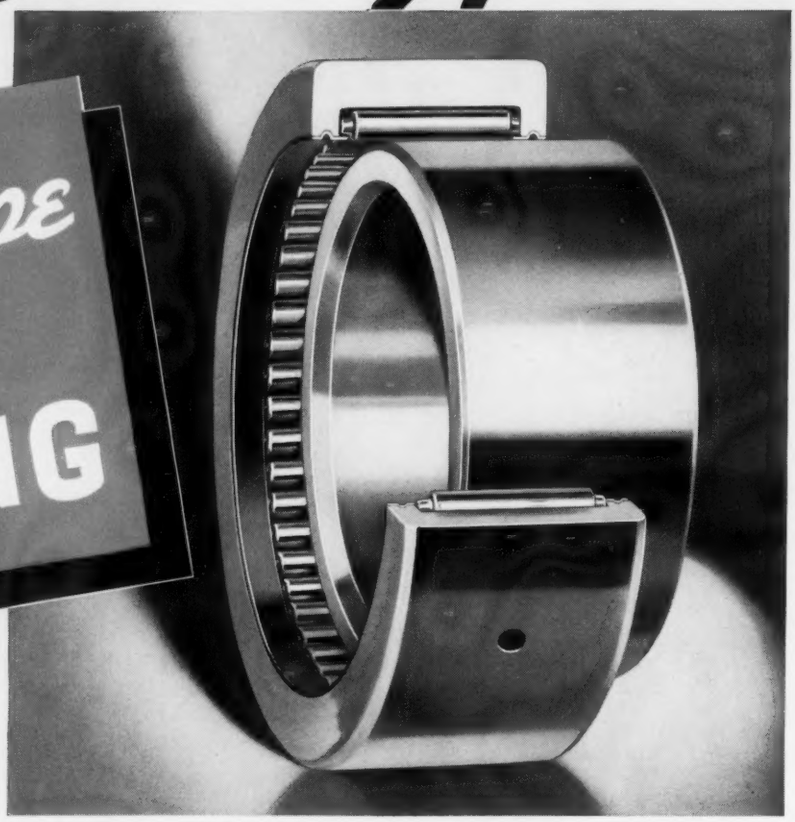
Rolls produced by the Techni Process are tougher, with finer-grained necks and bodies. Denser chill, ideal response to heat, and minimum fire cracking result in exceptional tonnages per roll. Precise foundry control assures absolute uniformity.

Techni Rolls will eliminate your roll troubles. They will help you to cut costs and increase your production. Let us tell you the details about Mackintosh Rolls made by the "Techni" Process.

MACKINTOSH-HEMPHILL CO., Pittsburgh and Midland, Pa.

Announcing!

A New Type QUILL BEARING



CARRIED IN STOCK

Features of Design

★ **ONE-PIECE** channel-shaped outer race with rollers definitely retained.

★ Correctly proportioned rollers with husky curvilinear trunnions.

★ Rigid surfaces, accurately hardened and ground, confining rollers endwise.

★ Simplified design—No fragile parts—Easy to assemble.

★ High load carrying capacity—Minimum space requirement—Low cost.

★ Wide range of sizes carried in stock.

BANTAM'S new *Standard* Series of *Quill (Needle) Bearings* offers many advantages over previous designs. The result of long experience in the production of billions of Quill Rollers, these bearings were designed for use—

1. Where loads are heaviest; 2. Where reliability is paramount; 3. Where lower cost is an important factor.

Bantam *Standard Quill Bearings* possess the same fine quality which Bantam has built into the Quill Bearings used on Diesel Powered Streamline Trains. Numerous outstanding features are listed at the left.

SEND FOR BULLETIN NO. 103H

If you are a user of *any* type of large capacity radial bearing in sizes ranging from ½" I. D. to 5" I. D., or if present plain bearings are not completely satisfactory, be sure to send immediately for Bulletin No. 103H containing full engineering facts.

BANTAM BEARINGS CORPORATION
SOUTH BEND, INDIANA
Subsidiary of THE TORRINGTON CO.
Torrington, Conn.

BANTAM BEARINGS
TAPERED ROLLER • • • STRAIGHT ROLLER • • • BALL BEARINGS

Your Invitation *from the*

ASSOCIATION OF IRON AND STEEL ELECTRICAL ENGINEERS
ORGANIZED 1907 AS ASSOCIATION OF IRON AND STEEL ELECTRICAL ENGINEERS
EMPIRE BUILDING · PITTSBURGH

TO OUR FRIENDS IN THE INDUSTRY:

The Association of Iron and Steel Engineers takes great pleasure in extending a cordial invitation to attend the thirty-fourth annual Convention and Iron and Steel Exposition, to be held in the Public Auditorium, Cleveland, Ohio, September 27, 28, 29, and 30.

A very interesting technical program, perhaps the best ever presented by the Association, will present leading steel plant operators, designers and manufacturers, in discussions of the latest advancement in steel mill engineering.

In addition, the Exposition, occupying twenty-five thousand square feet of floor space, will show the latest developments of approximately one hundred manufacturers of steel plant equipment.

The importance of engineering in the steel industry strongly emphasizes the value of cooperation with engineering activities. To our members and to those in the steel industry who should be our members, this Convention and Exposition offers the dual opportunity of obtaining the most advanced information on steel mill practice, as well as a better understanding of the problems and experiences of others in the industry.

Active participation in the various activities of the Convention, which means full use of the advantages afforded by the technical discussions and by careful study of the equipment and materials offered through the exhibits, cannot help but inspire new views, new ideas--and it is from such substance that progress and development spring forth.

Very truly yours,

L. F. COFFIN
PRESIDENT
A.I.S.E.

LFC:EMH

BOARD OF DIRECTORS 1938

President, L. F. COFFIN, Supt. Mech. Dept., Bethlehem Steel Company, Sparrows Point, Md.

1st Vice Pres., C. C. Wales, Asst. General Mgr., Algoma Steel Corporation, Sault Ste. Marie, Ontario, Canada.

2nd Vice Pres., W. A. Perry, Supt. Elec. and Pow. Dept., Inland Steel Company, Indiana Harbor, Indiana.

Director-at-Large, M. J. Conway, Paul Eng. Laboratory, Steel Company, Coatesville, Penna.

Honorary Directors, Jas. Farrington, Elec. Supt., Wheeling Steel Corporation, Steubenville, Ohio.

E. Friedlander, Pittsburgh, Penna.

A. C. Cummins, Asst. Mgr. of Operations, Pgh. District, Carnegie-Illinois Steel Corporation, Pittsburgh, Pennsylvania.

Past Presidents, H. G. R. Bennett, Asst. General Supt. Carnegie-Illinois Steel Corporation, Duquesne, Penna.

G. R. Carroll, Asst. Supt. of Maintenance, Jones and Laughlin Steel Corp., Aliquippa, Pa.

Treasurer, F. E. Flynn, General Manager, Steel Corporation, Warren, Ohio.

Secretary, J. L. Miller, Asst. Chief Comb. Engineer, Republic Steel Corporation, Cleveland, Ohio.

Director, C. C. Pecu, Laboratories Engineer, Bethlehem Steel Company, Lackawanna, N. Y.

Director, C. L. McGranahan, Asst. Gen. Supt., Jones & Laughlin Steel Corp., Pittsburgh, Penna.

Director, J. A. Claus, Chief Engineer, Great Lakes Steel Corporation, Ecorse, Michigan

Director, F. E. Leahy, Vice Pres., Youngstown Sheet and Tube Company, Youngstown, Ohio.

Director, E. C. Marshall, Chief Electrical Engineer, Youngstown Sheet & Tube Company, Youngstown, Ohio.

Director, J. F. Headley, Asst. Chief Engr., Carnegie-Illinois Steel Corporation, Gary, Indiana.

Director, I. E. Harrell, Chief Electrician, Tennessee Coal, Iron and Railroad Co., Fairfield, Alabama.

Director, E. F. Blaine, Director Industrial Relations, Jones and Laughlin Steel Corporation, Pittsburgh, Pa.

Director, A. W. Stierd, Maintenance Supt., American Rolling Mill Company, Middletown, Ohio.

Managing Director
BRENT WILEY
Empire Bldg., Pittsburgh

L. F. COFFIN
President, A.I.S.E.

F. E. FLYNN
Treasurer, A.I.S.E.

J. L. MILLER
Secretary, A.I.S.E.

C. C. WALES
1st Vice President, A.I.S.E

CLEVELAND

GREAT INDUSTRIAL CENTER

By W. J. CAMPBELL
Associate Editor, STEEL

■ CLEVELAND, crossroads of commerce, is strategically located in relation to raw materials and transportation facilities. Here comes ore from Minnesota and northern Michigan, brought down the lakes by a fleet of more than 300 freighters with capacities up to 15,000 tons.

From the south and southeast comes coal by the millions of tons. From the west, Ohio and Michigan, comes limestone, third ingredient essential to steel manufacture. Logical, then, is this city's position as a major iron and steel producing center.

In steelmaking capacity, Cleveland district trails only Pittsburgh, Chicago, eastern Pennsylvania and the Mahoning Valley. It has ingot capacity of 5,712,000 tons, about 8.2 per cent of the country's total. Its blast furnaces have a rated capacity of about 3,500,000 tons pig iron, more than 6 per cent of the nation's total.

Cleveland's chief claim to fame as an industrial center, however, lies in her diversification. Of 280 classes of industry set up by the government for census purposes, 218 are found in Cleveland. Here are located some 2500 manufacturing plants, counting only those whose products exceed $5000 annually. In 1937 these plants employed 150,000 wage earners, paid $220,000,000 in wages, produced commodities valued at $1,100,000,000.

Iron and steel accounted for 15 per cent of the city's total manufactures in value. Motor vehicles and parts accounted for 11½ per cent; other products, largely ferrous metals, such as machinery, stoves and ranges, foundry products, bolts, nuts and rivets, springs, boilers, cranes, excavators, forgings, hardware, tools and similar products, accounted for 18 per cent. If nonferrous metal products are included, total metal products would amount to about half Cleveland's manufactures.

A summary of metal plants by

Piles of ore like these can be seen in many places in Cleveland

Metropolitan Cleveland looking southeast from the lakefront

classes: Steelworks and rolling mills, 12; motor vehicles and parts, 23; electric machinery, 69; blast furnace products, 3; nonferrous alloys, excepting aluminum, 42; machinery, not otherwise classified, 54; machine shop products, 82; stoves and ranges, 20; stamped and pressed metal, enameling, etc., 39; screw machinery products, 32; machine tools, 19; foundries, 28; bolts, nuts and rivets, 15.

These figures are for Cleveland proper. If surrounding towns are included in the Cleveland district, the picture is similar but larger.

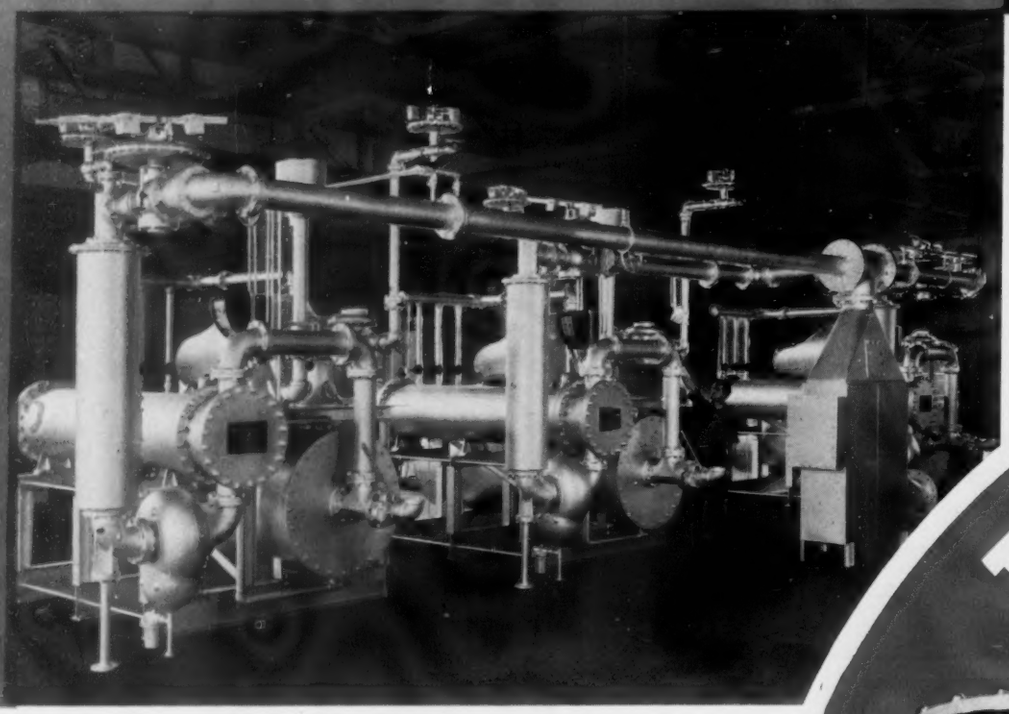
Located where iron meets coal, it is natural that Cleveland should be a transportation center. Between Cleveland and a point 47 miles to the south are to be found the east and west trunklines, with the result the great transcontinental traffic flow is within a figurative stone's throw.

East, west, and south, trains speed on seven railroad systems carrying raw materials or goods Cleveland has bought or made.

In Cleveland is either owned or managed about 80 per cent of all the lake carriers, and to this port come shiploads of iron ore, automobiles, crude sulphur and miscellaneous cargo. The city has 18 miles of industrially practical waterfront, 13 on the Cuyahoga river, five on Lake Erie.

Cleveland is among the leading iron ore receiving ports; in some

Cuyahoga river with steelworks in background



KE

INDUS

CARBUR

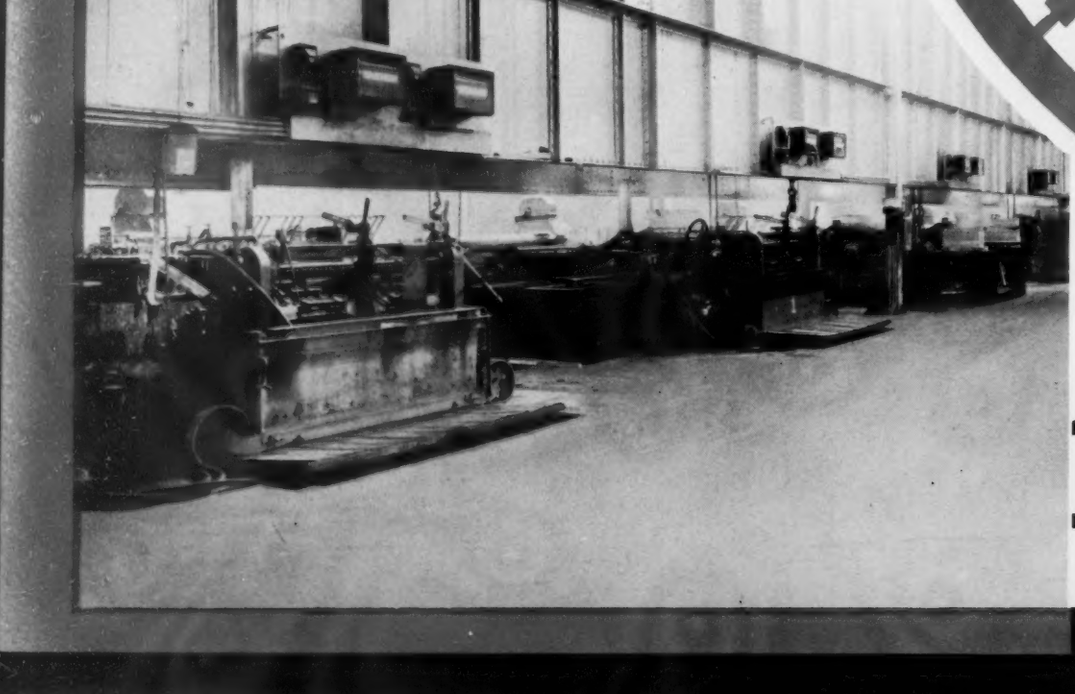
ATMOS-GAS PRODUCER

Recognized as the standard for the industry, each Kemp Atmos-Gas Producer incorporates an Industrial Carburetor as the accurate proportioning device for fuel gas and air for combustion – just one of the quality features of a quality article.

★

Kemp Immersion Heating for tin pots, used by all major producers, and the feature of the world's most modern tin houses, is made possible by the Industrial Carburetor, exclusively Kemp.

TIN POTS



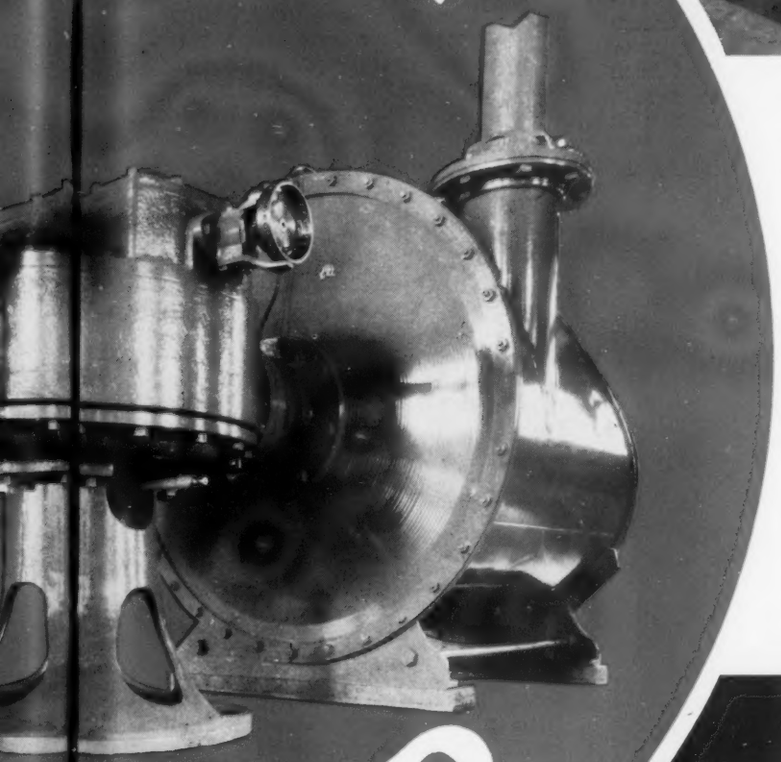
Photographs through the courtesy of:
Aetna Standard Engineering Company

KEMP of B

405 E. OLIVER ST. B

MP

TRIAL

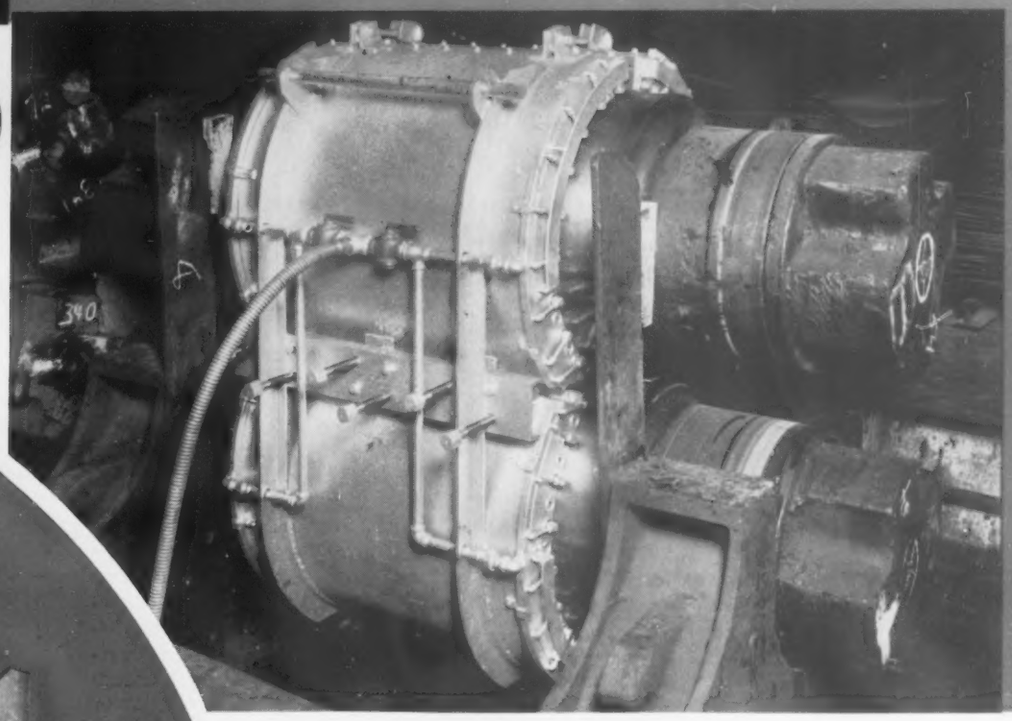


ETOR

Swindell-Dressler Corporation
Eastern Rolling Mill Company

BALTIMORE

BALTIMORE, MD.



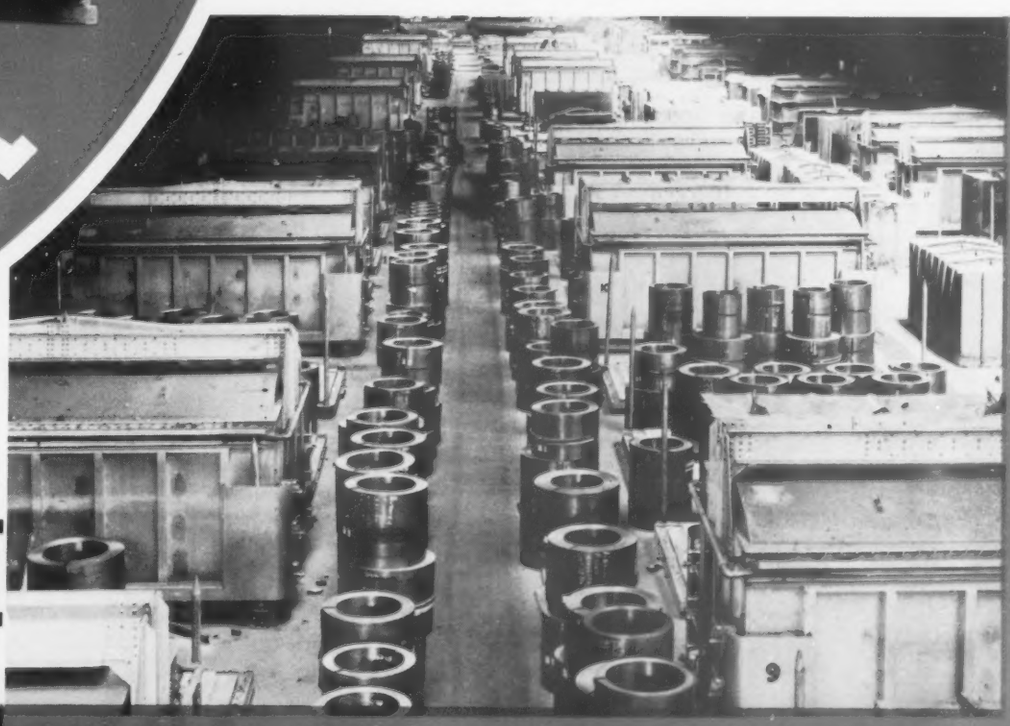
RADIATUBE

A revolutionary development in uniform and economical roll heating, Radiatube, incorporating several scores of individually heated incandescent elements, relies on the Industrial Carburetor to maintain uniformity of flame characteristics and heat input.

★

Tube type annealing covers, as manufactured by Swindell-Dressler Corporation, have established the economy standards for the industry. They rely on the Kemp Recirculating Radiator and the Industrial Carburetor for combustion efficiency.

ANNEALING COVERS



years leading all others. Last year, 10,083,000 tons was brought here from the upper lakes. Other nearby Ohio ports also received large tonnages. Conneaut in 1937 was receiving port for 9,635,000 tons; Ashtabula, 6,573,000 tons; Lorain, 3,915,000 tons; Fairport, 1,904,000 tons.

Cleveland's supremacy in the Lake Superior iron ore, coal and vessel trades dates back to the discovery of iron on the Marquette range in the upper Michigan peninsula in 1844. In 1846, J. Lang Cassells, Cleveland minerologist representing Cleveland capital, obtained a foothold in what later was known as the Cleveland mine. In the following year the Cleveland Iron Mining Co., one of the predecessors of the present Cleveland-Cliffs Iron Co., was created by a special act of the Michigan legislature.

Early attempts to produce iron in Michigan's upper peninsula met little success. Two little forges along the Carp river made a few blooms from the ore mined nearby as early as 1850. Production costs were excessive, however, and a few years later the iron companies abandoned attempts to produce iron in quantity in the mining district. Ore was then shipped to Ohio and Pennsylvania blast furnaces, starting what has since become "the greatest internal commerce in the world."

It was the iron ore trade that caused the rise of Cleveland's shipping interests and accompanying development of Ohio's Lake Erie ports. At first, ore was brought down in sailing vessels, 15 or 20 tons to the load. It had to be wheeled aboard the vessel at Lake Superior, dumped on the deck, portaged by wheelbarrow at the Soo to other vessels below the falls. Importance of the traffic soon became apparent; locks were built at the Soo; wood steamers replaced the tiny sailing vessels. In the 1880's, the first iron plate and first steel lake carriers were constructed at Cleveland yards.

Greater capacity of the ore vessels necessitated quicker and cheaper methods of unloading at lower lake docks. Early boats had been unloaded by plank and wheelbarrow. Later, barrels or tubs filled with the ore were lifted from the vessel's hold with block and tackle, using horses or a small steam engine for power.

It was at Cleveland that modern unloading machinery was developed. Alexander E. Brown in 1880 perfected an ore bridge, which laid the foundation for the business of the Brown Hoisting Machinery Co. George H. Hulett, of the Wellman-Seaver-Morgan Co., Cleveland, later developed the Hulett unloader and installed the first equipment at Conneaut for the Carnegie Steel Co. in 1899.

Brown and Hulett types of unloading machinery now are found at all important ore-receiving docks. They made possible unloading the huge lake freighters in a few hours and reduced the cost to about 10 per cent of the early methods.

But Cleveland was not content with passing along to others the further manufacture of iron ore from iron and steel. Soon after Lake Superior ore was received here iron works were established. Although foundries were founded as early as 1828, the first rolling mill, the Forest City Iron Works, was incorporated in 1853 by Salmon A. Powers, Samuel Foljambe, Woods Mabury, John Hays and John McClellan. An advertisement in the 1857 city directory announced they manufactured "boiler iron, propellor buckets, locomotive firebox plates, etc. from Lake Superior iron."

The next mill was built in 1857 by A. G. Smith and others to reroll rails and was called the Railroad Iron Mill Co. In the same year Henry Chisholm, John Jones and David I. Jones started a mill at Newburgh which later became a part of American Steel & Wire Co.

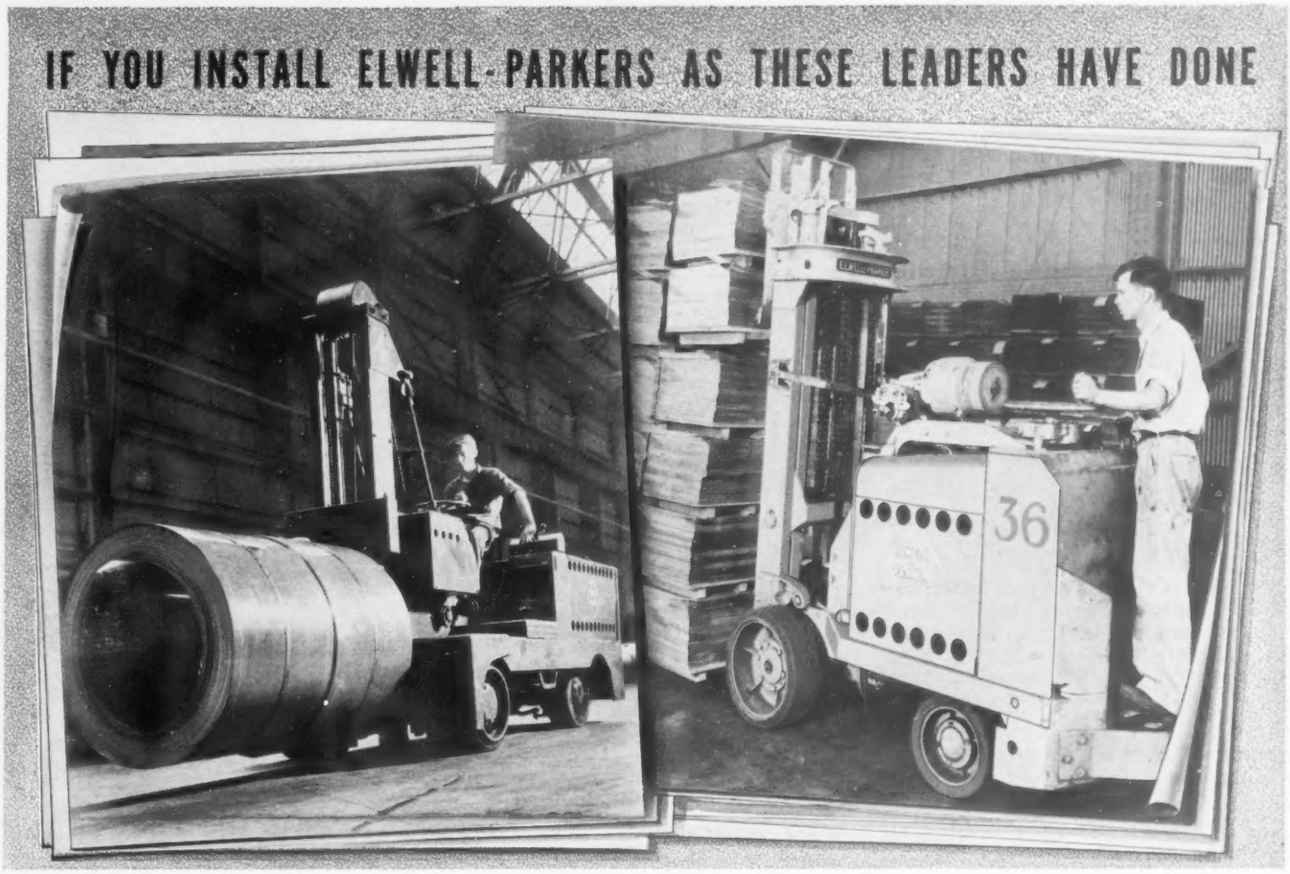
First district blast furnace was built at the Newburgh plant in 1861, two years before the name of the firm was changed to the Cleveland Rolling Mill Co. In the fall of 1868, the company completed the first bessemer plant in the district, and the fifth in the country. The two 5-ton converters were capable of producing about 25 tons a day.

A few years later, Charles A. Otis, who had built a steam forge in 1852 to make wrought iron forgings, became interested in a new process for making steel. He traveled to Europe to study the method, then in an experimental stage, developed by Dr. Carles W. Siemens in Germany and the brothers Martin in France.

Returning to the United States in 1873, he organized a $300,000 com-

Giant unloaders speed ore handling on the lakefront

You Can Profit
BY LOW COST HANDLING OF STEEL



PRODUCERS of strip, shapes, rods, etc., have many Elwell-Parkers that have delivered uninterrupted service for years.

Elwell-Parker engineering and service continue playing their part in a noticeable inclination on the part of mill engineers to accept power industrial trucks, along with traveling cranes and kindred equipment, as dependable links in production schedules.

This dependability occasions their repeated requests for bids from Elwell-Parker for new and changing types of trucks to fit into the modern mill layout—knowing when they order Elwell-Parkers, they can bank on continuous performance and lowest up-keep costs.

Elwell-Parker steel plant specialists are backed by an engineering staff thoroughly conversant with today's steel plant problems and will consult with your engineers on requests to lower today's costs for tomorrow's profits. When shall we send them? The Elwell-Parker Electric Company, 4501 St. Clair Avenue, Cleveland, Ohio.

ELWELL-PARKER *Power Industrial* TRUCKS

ESTABLISHED 1893 • BUILDING POWER INDUSTRIAL TRUCKS SINCE 1906

pany and employed a capable young engineer, Samuel T. Wellman, to build a plant here.

The Otis Steel Co.'s Cleveland plant is claimed the first in the country constructed exclusively to manufacture acid open-hearth steel. The two original 7-ton acid open-hearth furnaces were completed in 1874 and created intense interest in the industry. Previously several wrought iron companies in the East had built open-hearth furnaces as additions to their present plants.

The original open-hearth plant was the nucleus of the Otis Lakeside works. A few years later, in 1886, the company introduced the basic open-hearth method.

Early success of the Otis company was widely noted, and in 1889, a group of British investors purchased majority stock, retaining control until 1919. By 1912, expanding business had caused the Lakeside plant to become cramped, and the company decided to increase facilities. In August, 1914, just a few days after the World war broke out, the Riverside works on the Cuyahoga went under power. While the Lakeside works continued to make plates and steel castings, the Riverside works specialized in sheets, strip and light plates.

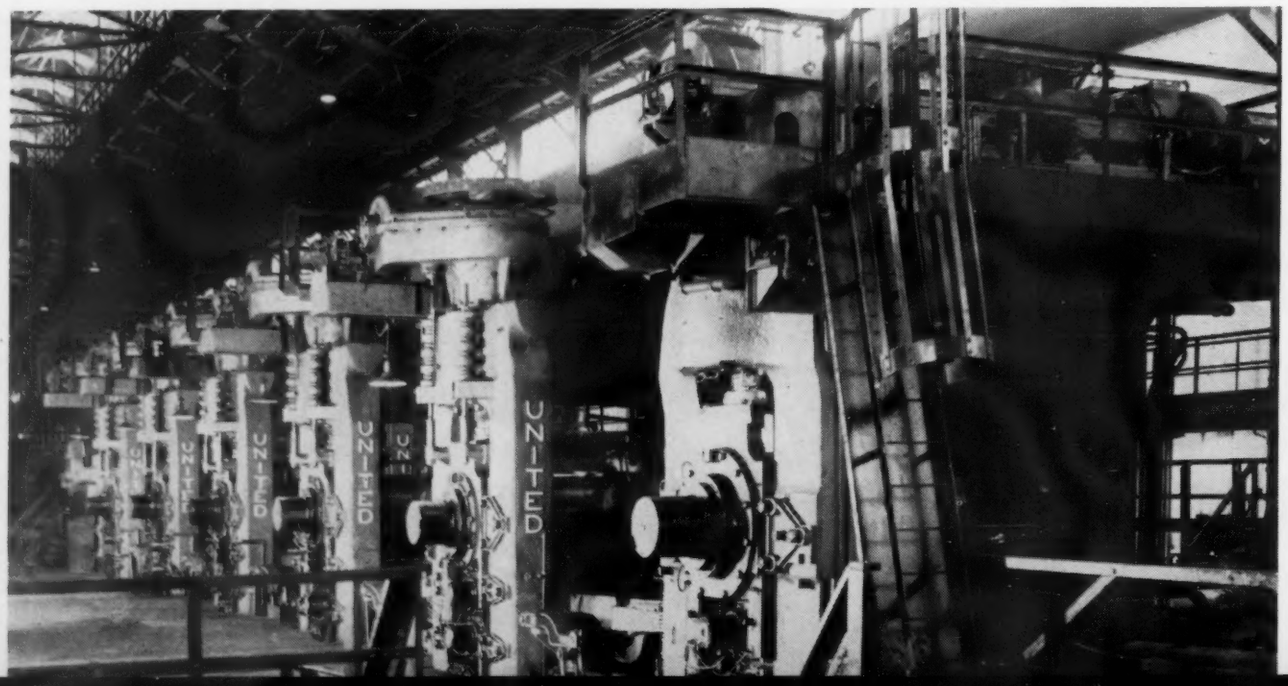
Company now has two blast furnaces, 13 basic open-hearths, three acid open-hearths. Ingot capacity is 866,000 tons.

Republic Steel Corp.'s formation on the eve of the depression in 1929 brought together a number of district mills. Largest producer in Cleveland and third largest in the country, Republic's main offices and some more important works are located here.

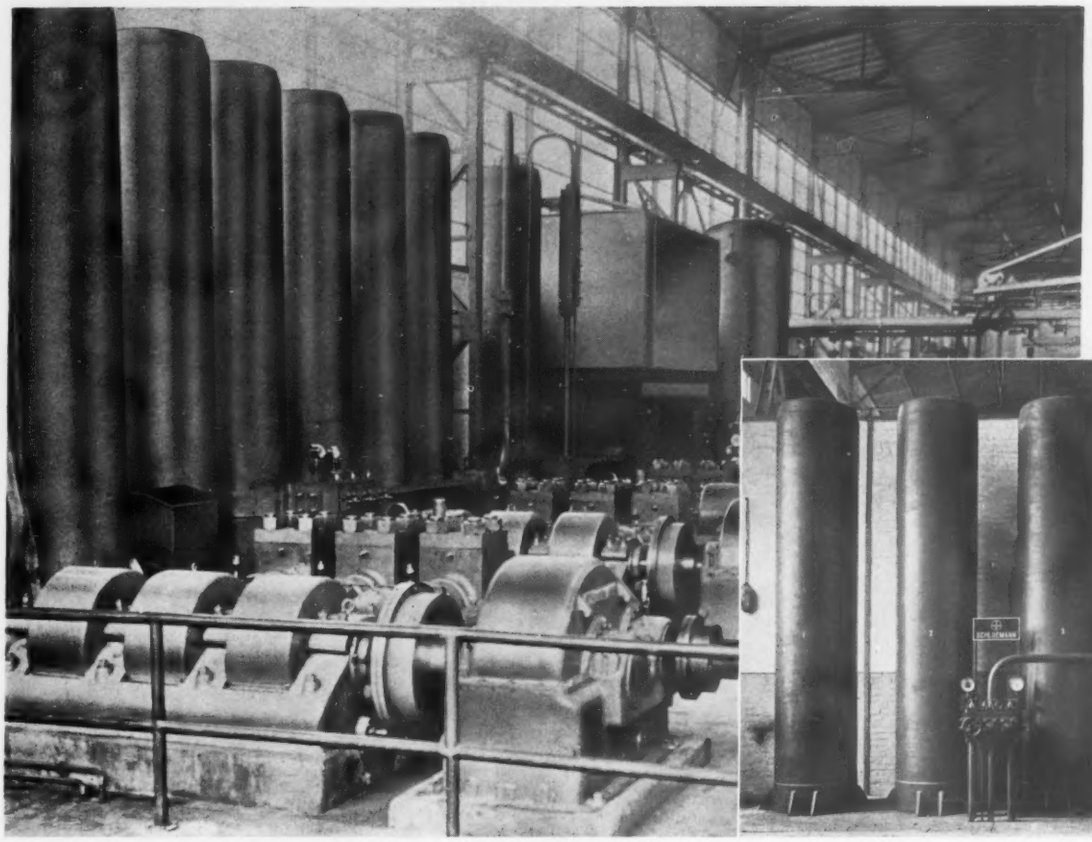
Last year the company completed a new 98-inch continuous sheet-strip mill, largest and most modern of its

Below is view of finishing stands Nos. 1 to 6, inclusive, at Otis Steel Co.'s hot mill, Cleveland

Above shows reeling of wire fence at end of processing line at Newburgh mill of American Steel & Wire Co.



To Users of Hydraulic Machinery



Accumulators furnished in a wide range of sizes from 50 gal. up; for pressures up to 4500 lb. per sq. in.

System shown above has 200 gal. useful water capacity with pressure of 2,850 lb. per sq. in.

System shown at left has 450 gal. useful water capacity with pressure of 4,250 lb. per sq. in.

SCHLOEMANN

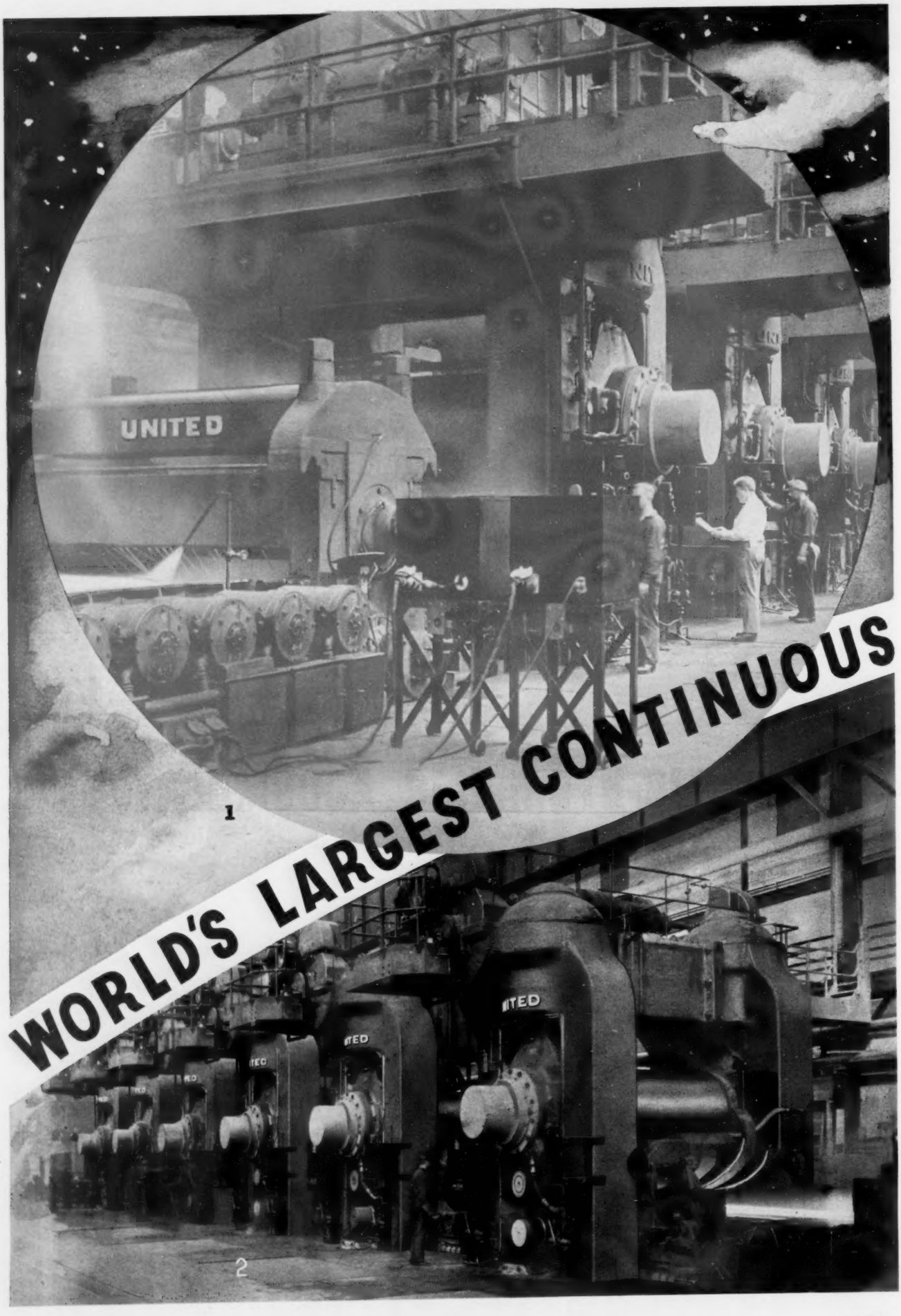
offers AIR-HYDRAULIC ACCUMULATORS

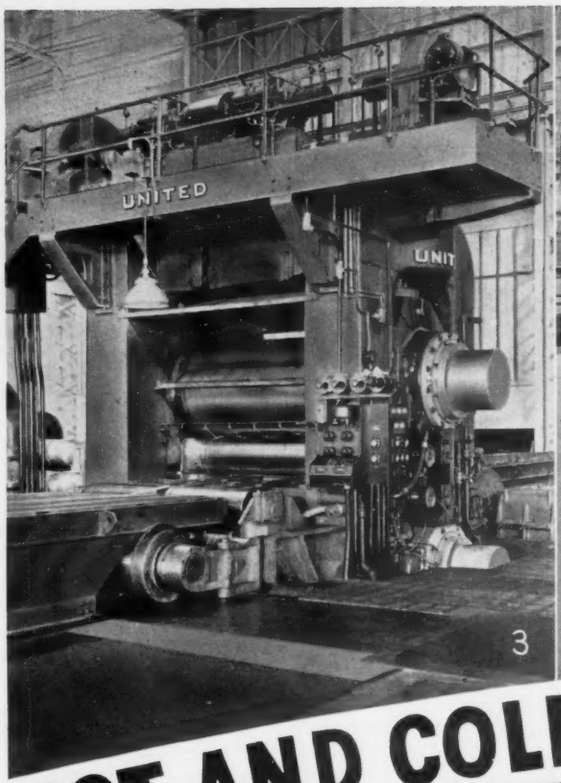
. . . . with the following features:

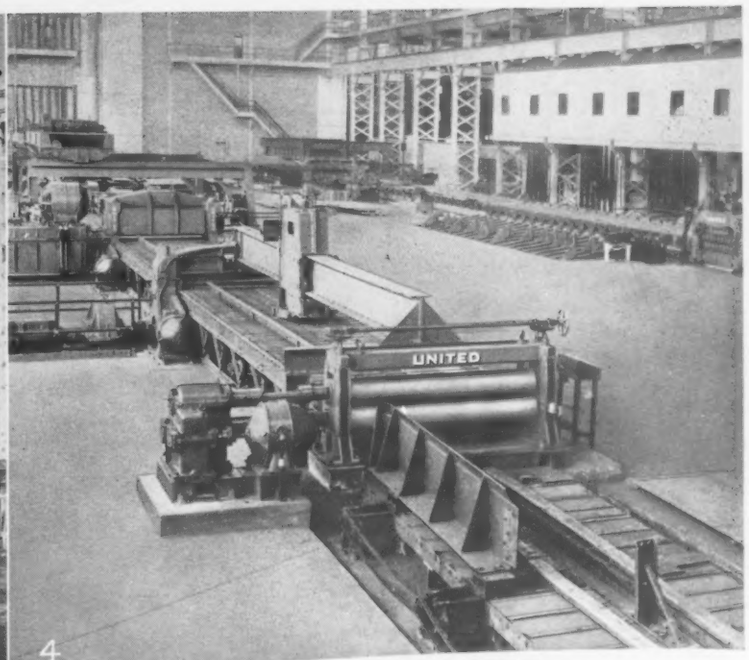
- Shockless with rapid withdrawal of water
- Pistonless
- Automatic Operation
- Seamless Containers
- Maximum Safety
- Low Maintenance
- Less Space Requirements

We invite the opportunity to discuss our Accumulators with you.

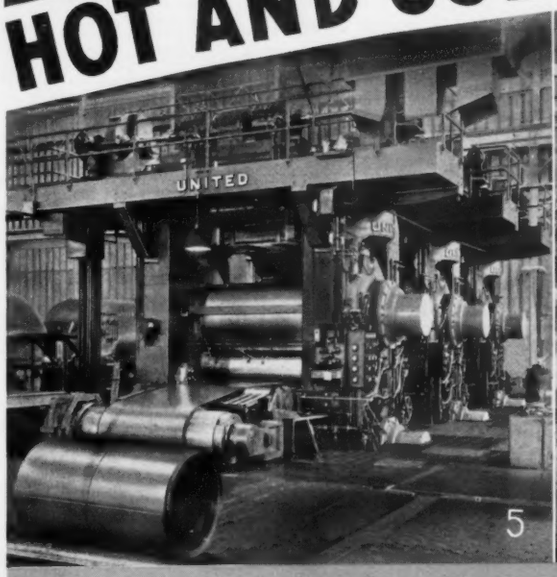
SCHLOEMANN
ENGINEERING CO.
Rolling Mill Machinery
PITTSBURGH, PA.
Hydraulic Presses

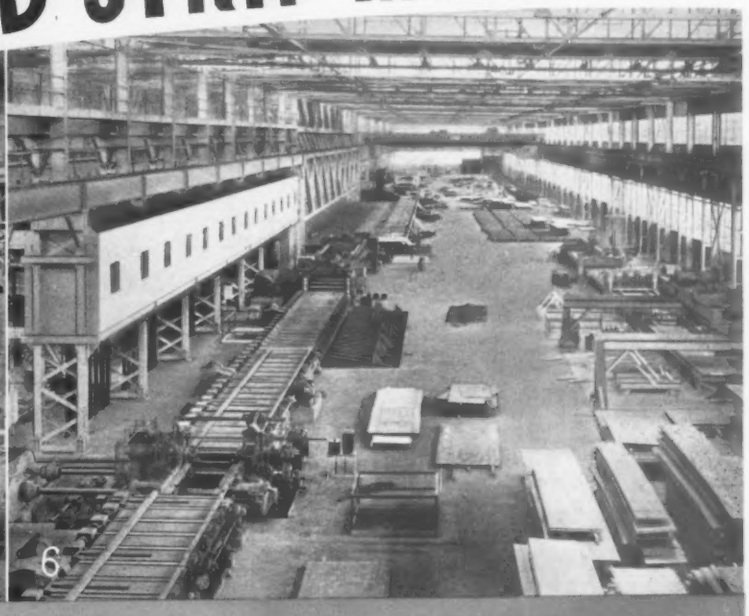

UNITED
WORLD'S LARGEST CONTINUOUS
1
2





HOT AND COLD STRIP MILL ★ ★





1
98" Continuous Hot Strip Mill — Flying shear at delivery end.

2
98" Continuous Hot Strip Mill—Finishing Stands.

3
98" Single Stand Combination Skin Pass Mill for Strip or Sheets.

4
5/16" Plate Shearing Line Showing Magnetic Depiler, Roller Leveler, Upcut Shear and Gauge, Pinch Rolls and Piler.

5
98" 3-Stand Tandem Cold Reduction Mill with Automatic Uncoiler and Strip Feeder.

6
1/2" Plate Shearing Line and Delivery side of Plate Transfer Bed.

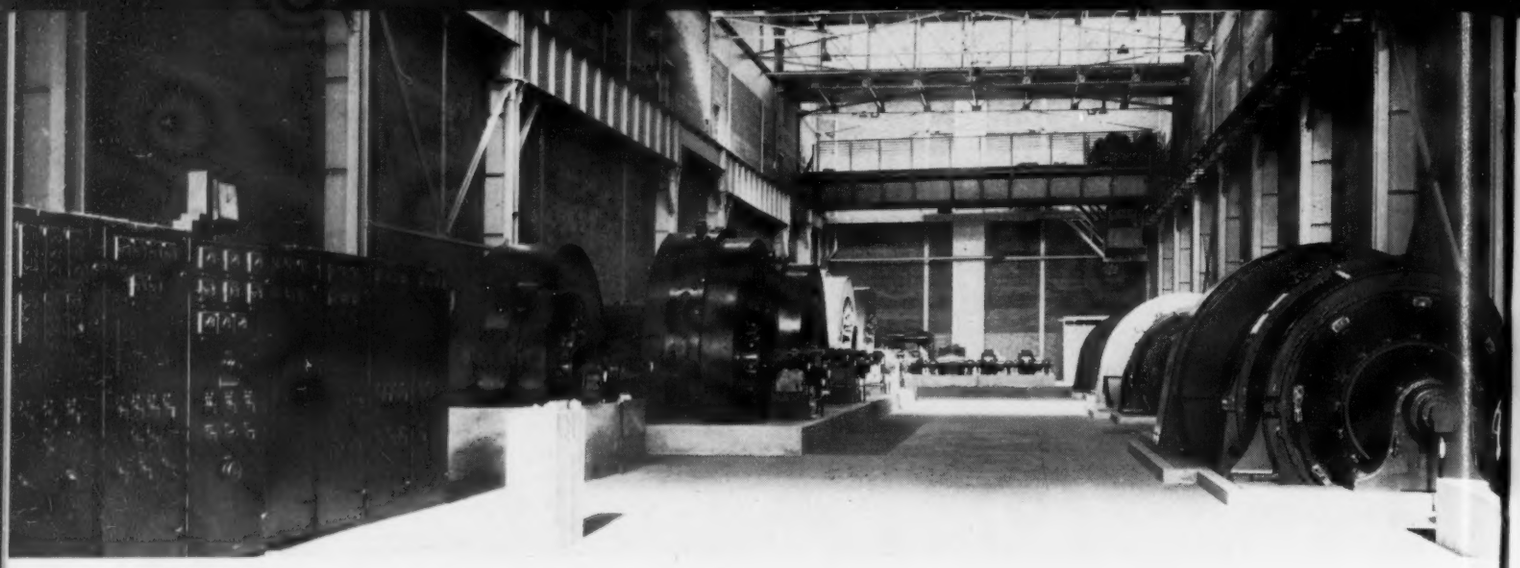
Designed and Built by UNITED

ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH · PENNSYLVANIA

ASSOCIATED COMPANIES:

DAVY AND UNITED ENGINEERING CO., LTD., SHEFFIELD, ENGLAND — DOMINION ENGINEERING WORKS, LTD., MONTREAL, P.Q.



Motor room above will be shown visitors to Republic Steel Corp.'s new strip mill on an inspection trip

kind, raising Cleveland to front rank as a producing center for flat-rolled products.

Republic has ingot capacity in Cleveland of 1,400,000 tons; in Canton and Massillon, 1,446,000 tons. Its products in the district cover a wide range in both carbon and alloy steels, and fabricated items.

This diversification in production and markets is illustrated by the fact that during 1937, 28.1 per cent of the corporation's total output was absorbed by miscellaneous industries not included in the 12 or 15 major steel consuming industries.

As mentioned earlier, the history of American Steel & Wire Co., United States Steel Corp. subsidiary, in Cleveland dates back to 1857. The Newburgh works, formed by Henry Chisholm and the Jones boys, was one of the earliest Cleveland rolling mills.

Immediately after organization in 1899 of the American Steel & Wire Co. of New Jersey through a series of consolidations, an expansion program was inaugurated, giving increased capacity for wire products. Company now has blast furnaces and docks, coke ovens and four rolling mills in Cleveland. The latter include the American, Cuyahoga, Consolidated and Newburgh mills. Wire rods, fencing, nails, wire, hot and cold-rolled strip are principal steel products.

Main offices also are in Cleveland. Company has no steelmaking capacity in the district.

Largest works of the National Tube Co., also a United States Steel Corp. subsidiary, is at Lorain, just west of Cleveland. Ingot capacity is 1,500,000 tons, 900,000 tons basic open-hearth and 600,000 tons bessemer. Works has 208 by-product coke ovens, 5 blast furnaces.

Principal products are buttweld, lapweld and seamless pipe, girder rails, splice bars, skelp and blanks or pierced billets for seamless tubes and castings.

Another Steel corporation representation is the Cleveland works of Cyclone Fence Co. Chief products are chain link fabric, lawn fence and gates. Cleveland also is headquarters for the Pittsburgh Co. and United States Steel Products Co. fleets.

Empire Sheet & Tin Plate Co., Mansfield, has basic open-hearth ingot capacity of 325,000 tons, produces hot-rolled, hot-rolled annealed, special black, enameled and electrical sheets.

Timken Steel & Tube division, Timken Roller Bearing Co., Canton, has open-hearth and electric furnaces with capacity for 175,000 tons open-hearth ingots and 165,000 electric. Products include alloy and carbon ingots, blooms, billets, bars, wire rods, piercing bars, hot and cold-rolled and cold-drawn seamless tubing and mechanical tubing.

Among non-integrated mills is the W. H. Davey Steel Co., Cleveland, with capacity for rolling 36,000 tons hot-rolled annealed sheets and plate.

Republic's new cold mill shown here is a wonder of speed and accuracy. It also may be seen on an inspection trip

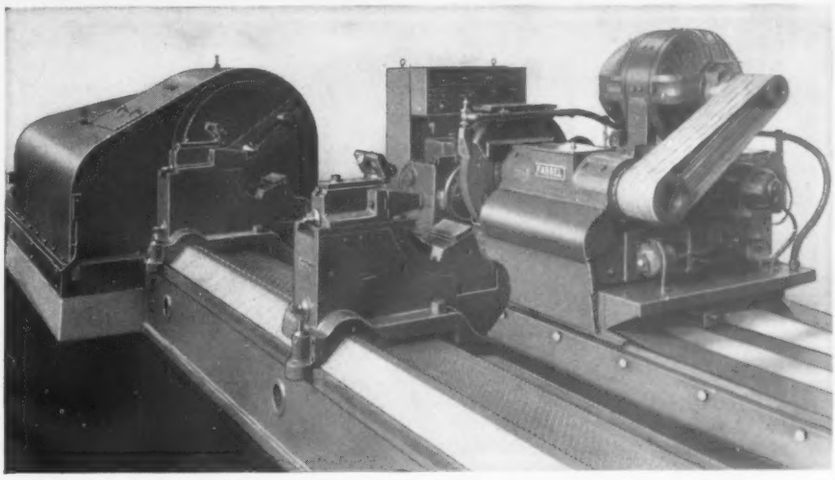
FARREL REG. U.S. PAT. OFF.

EQUIPMENT for the STEEL MILL

FOR LOW-COST PRECISION ROLL GRINDING

Farrel Heavy Duty Roll Grinders rough and finish rolls of any material; grind a perfect surface free from marks of any kind, with straight, concave or convex contours of exact symmetry and accuracy. They reduce the time required for finishing, increase the output of finished rolls and lengthen the life of the rolls themselves.

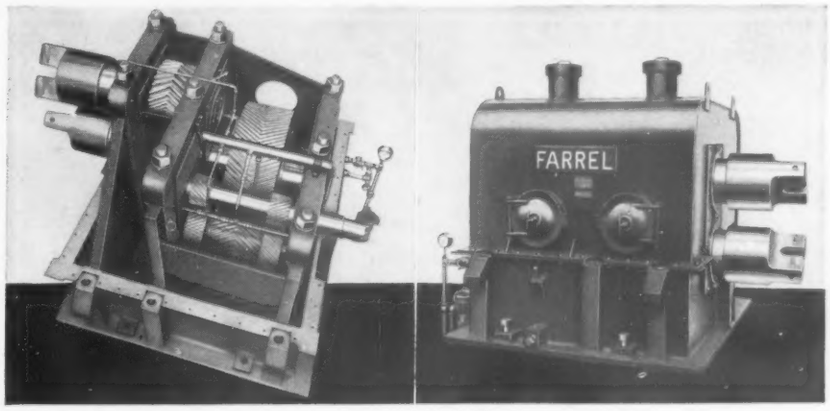
Visit our booth, No. 127, at the Iron and Steel Exposition in Cleveland and learn about the advanced features of design which are responsible for the smooth, vibrationless performance, superior finish and high output of Farrel Heavy Duty Roll Grinders.



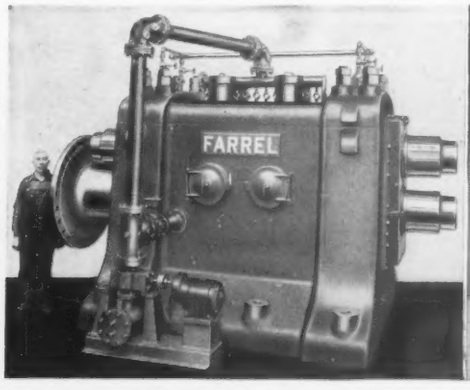
Farrel Heavy Duty Roll Grinders are built in six standard sizes to grind rolls up to maximum diameters of 24", 28", 36", 44", 50" and 60", and lengths from 8' 0" to 26' 0" between centers. The machine illustrated above is 60" x 22' 0".

SMOOTH, QUIET RUGGED GEAR DRIVES

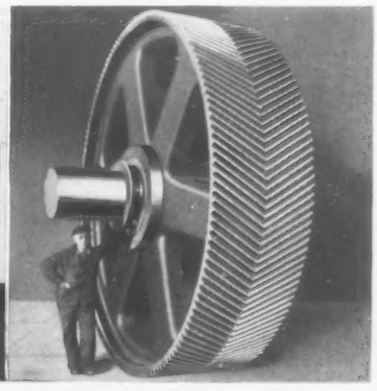
Farrel Heavy Duty Rolling Mill Reduction Units and Pinion Stands are of rugged construction to withstand the stresses, shocks and wear incident to high speeds and heavy loads encountered in modern mill practice, yet they are made with a high degree of precision to provide the quietness and smoothness of operation which is as essential in large mill drives as in smaller machines. Modern design, modern materials and modern methods of construction are properly combined and applied by engineers and mechanics who have a thorough knowledge of the problems involved.



Two views of a Double Reduction Unit with integral 20" Pinion Stand for driving 20½" and 53" x 48" four-high temper pass mill. Drive has welded steel case, single and double helical reduction gears, double helical mill pinions, anti-friction roller bearings.



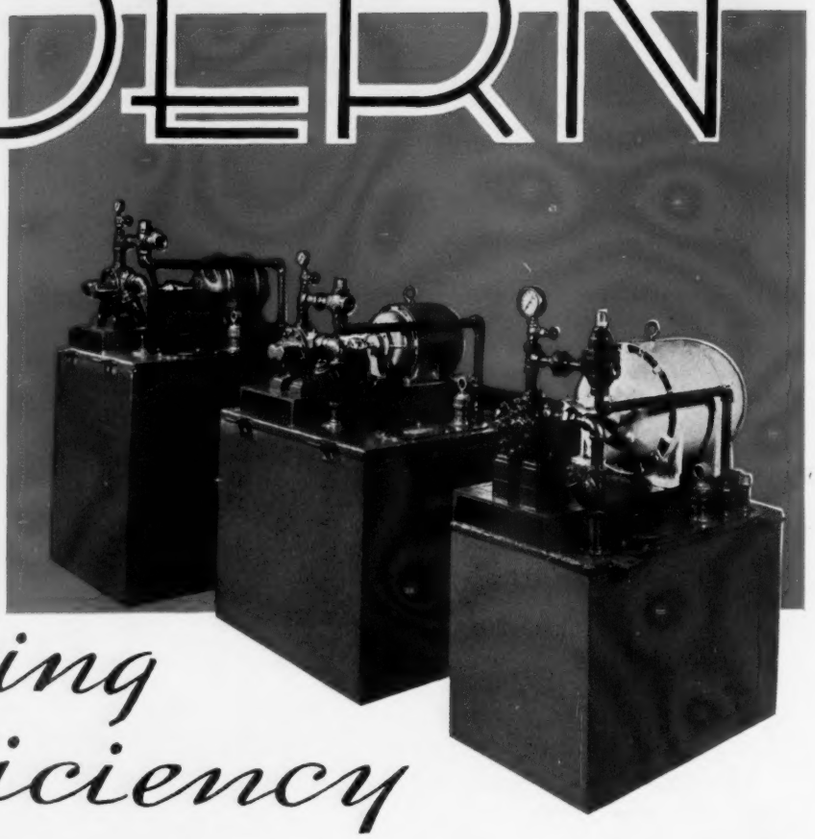
4,000 H.P. Pinion Stand for 20" and 52½" x 72" four-high reversing cold strip finishing mill. Housing of steel castings and rolled plate welded together.



Farrel-Sykes continuous tooth herringbone gear for rolling mill drive, 5,000 H.P., weight 51,700 lbs., 145" diameter, 145 teeth, 1 D.P., 40" face.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONN. - BUFFALO, N. Y.
Branch Offices: New York, Pittsburgh, Akron, Chicago, Los Angeles

MODERN MACHINERY DESERVES THE BEST IN *Lubricating Efficiency*



Industrial demands of constant and continuous production place added burden on lubricants and lubricating systems. Roper Lubricating oil and hydraulic power units, custom built to suit each installation assure positive lubrication and trouble-free service at all times.

Sleeve bearing units with capacities from 1 to 700 g.p.m. at 100 pound maximum pressure and ball bearing units with capacities from 6 to 50 g.p.m. under maximum pressures of 750 pounds may be your answer to lubricating problems on . . .

REEL STRIPPERS • SHEET PILERS • STRIP COILER AND RECOILERS • FEED ROLLS • HOT BED AND RUNOUT TABLE • LEVELER DRIVES • GEAR REDUCERS • PINION STAND LUBRICATION • GENERAL ACTUATION OF HYDRAULIC RAMS

For Further Information, stop at Booth No. 129 at the Iron and Steel Exposition or write today for full technical information.

GEORGE D. ROPER CORPORATION • Rockford, Illinois

OFFICES: Pittsburgh, and other principal cities

ROPER *Rotary* PUMPS

DEPENDABLE - SINCE 1857

NEW WESTINGHOUSE DISCOVERY

CONTROLS WELDING CURRENT

WITHOUT MOVING PARTS

Not a movement of any part, as the high-amperage current required for resistance welds is switched on and off, 400 times or more per minute! Impossible? Not with this startling new Westinghouse device for opening and closing resistance welder transformer circuits WITHOUT a single moving part.

WELD-O-TROL minimizes maintenance costs and outage charges in connection with resistance welder operation because it has no moving parts. WELD-O-TROL is the result of years of research by Westinghouse engineers for a new and better means of handling the high, intermittent currents required for resistance welding.

For full details mail the coupon today. Westinghouse Electric & Mfg. Co., Dept. 7-N, East Pittsburgh, Pennsylvania. J-20735

REDUCES MAINTENANCE

...opens and closes welder circuit *without moving parts.*

MAKES BETTER WELDS

... no mechanical delay . . . gives full accuracy of welding timer.

WORKS WITH PRESENT TIMER

. . . will operate with existing timing mechanisms.

Westinghouse Electric & Mfg. Co.,
Dept. 7-N, East Pittsburgh, Pa.
Tell me more about the WELD-O-TROL power switch for resistance welders.

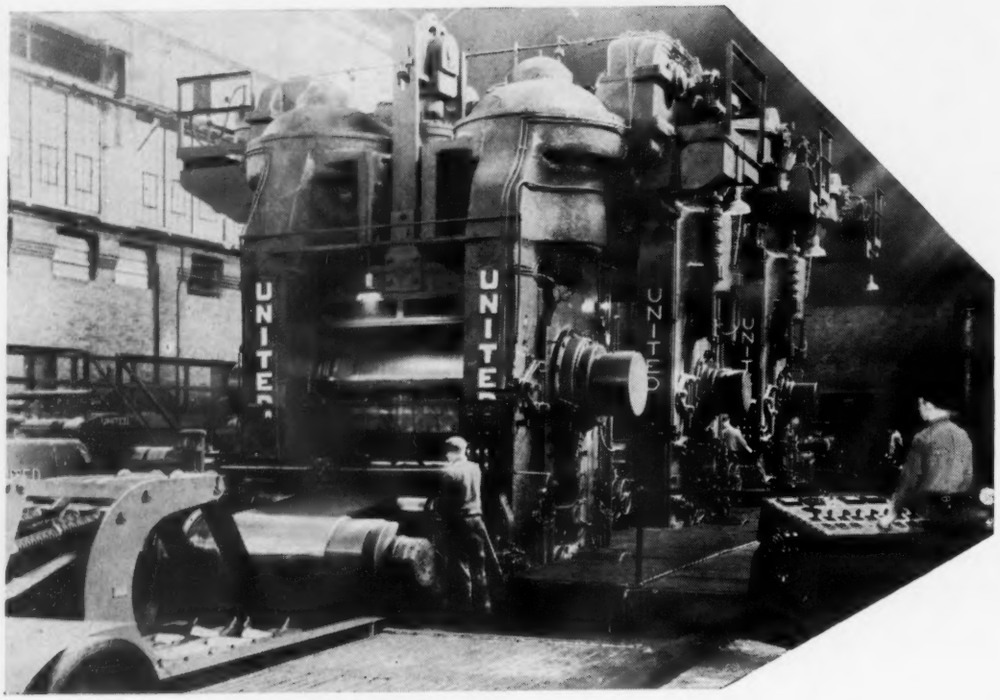
Name_____

Address_____

City_____

Westinghouse WELD·O·TROL Power Switch

FOR RESISTANCE WELDERS



TRENDS

Cold mills with new belt wrapper at Otis Steel Co., Cleveland. Control pulpit at right

■ NEVER in the history of America's steel industry has management been confronted with more perplexing problems or more unpredictable factors. Uncertainties concerning prices, disproportionate wages, a highly unsatisfactory volume of demand, plus all the other commercial problems of the business, leave the technique of operations and production as the one aspect in which steel's future is pretty well defined.

One can not set foot in any good sized city today without seeing the proof of recent engineering progress in the steel industry on all sides. The commonplaces of our mass production economy, which probably received its greatest single impetus from the introduction of continuous rolling mills and the advances in quality and workability which paralleled these mechanical achievements, are all around us.

With a great automobile industry offering a ready market for sheet steel, our metallurgists and production engineers applied themselves to the task of manufacturing steel of vastly improved character. They did it through the continuous mill. The product was stronger and at the same time could be worked more easily, and had a surface uniformity which opened up the opportunity for great economies in body finishing.

Just how much these advances in our own industry contributed to the expanding economy which sent American living standards on a steady upward climb through the '20s, no one can say for sure. It is a fact, however, that during this period automobile registrations almost trebled and the automotive industry advanced from fourth to first place among the consumers of iron and steel products in the United States. The continuous strip mill was an engineering answer to the needs established by the spectacular but healthy growth of this great market.

If there was any doubt beforehand that American industry would have to build its future markets on the basis of higher quality and lower prices, the continuous mill and comparable production methods in other industries removed it. In no case, however, was the improvement of such far-reaching significance as in steel. Box-type automobile bodies disappeared and the streamlined era was launched on its way. It was steel from the miraculous modern mills which represented the combined genius of mechanical, civil, electrical and metallurgical engineers that made this first streamlining possible and put the automobile industry out in front, to be the pacemaker in all industrial design, just as Paris, Fifth Avenue and Hollywood set the trend in women's fashions.

We can thank the founders of the automobile industry for the market which helped us find ourselves, but every user and purchaser of any metal product must take his hat off to the men in our own industry whose inventions, discoveries and constant labor have advanced the art of steel-making to the position it now occupies. They have given us high tensile, noncorrosive and heat-resisting steels whose influence extends throughout all manufacturing, transportation and power industries. The avenues opened up by these achievements reach into every corner of American family life.

But where do we go from here? Eager to participate in the business of equipping America for the enjoyment of the "more abundant

Show Steel's Role in Our Expanding Economy

By E. J. KULAS
President
Otis Steel Co.
Cleveland

life" which is part and parcel of the expanding economy to which all our industries are committed, steel has stepped forward with major capital improvements that have rendered great portions of some plants totally obsolete. Premature obsolescence may be hard to reconcile, but any steel producer should promptly recognize that but for obsolescence of the products into which his tonnage finds its way, industry would soon bog down and volume would dwindle faster and faster, as each successive need was met. It is just as hard for the automobile owner to reconcile himself to a trade-in at 20 per cent of his car's cost price, when the old car "runs like new," as it is for the steel men to scrap or write off a workable but outmoded mill, but the car owner knows he has to face it when he trades the old car in. If we had a trade-in market for our own equipment it would probably be easier to face these situations.

The experiences of operation with modern, continuous production facilities, equipped with manifold controls which govern every aspect of precision operation, leave little cause for concern over the cost of obsolescence. It is the price of progress, for if progress on the customer's side of the fence means business, it must be a business producing factor no matter where it occurs.

With only a fraction of the industry's total steel-producing and rolling capacity at work in times like the present, the necessity for efficient operation quickly multiplies. Combustion engineers have made a very real contribution toward the attainment of this all-important efficiency in blast furnace and open hearth operations. While the big continuous mills of all types present a real problem in slack periods, because of their very size, their designers had the foresight to provide a maximum of flexibility with minimum lost time and expense.

The very pressure for efficiency has probably done more than any other single factor to force prompt recognition of the advantages offered by new and often revolutionary practices. The rapid acceptance of scarfing which came about with the availability of safe and economical industrial gases and equipment, and the modernization of all handling equipment are but two trends which prove this point.

Along with increased mechanical efficiency, we have made our plants just as safe as has been humanly possible, with the result that accident costs have been practically eliminated. We have carried the campaign against waste into every department of the industry, so that today employes as a whole are cooperating in a conscious effort to reduce the expenses of operation. They are coming to realize that every dollar saved means just so much more to be passed around the circle which includes employes, stockholders and customers.

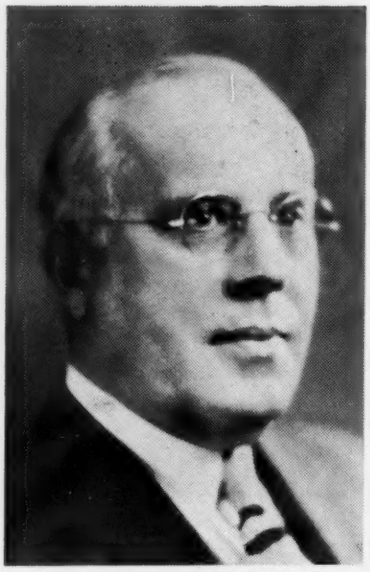
This understanding of the economic problems confronting industry, and their bearing upon employes and steel consumers, is rapidly laying the ghost of technological unemployment. The general public is finally beginning to see that the blessings which have come to us in the form of new household

conveniences, less expensive automobiles, better clothing values, higher quality foods and an all around better living, all stemmed directly from the engineering progress which has so greatly increased human productivity.

Resentment toward this progress is fast disappearing, and in its place we find a challenge which demands that America devise some means of distributing the fruits of its progress widely enough to sustain employment on a substantial, stable basis. This is a challenge which can only be answered by close cooperation in which all segments of our population work together.

Meanwhile, the job is primarily an engineering problem, i.e., how to develop new areas of productive employment, either by bringing existing products within reach of larger markets through lower costs, or by devising new products whose manufacture would stimulate raw material purchasing and open up new employment opportunities. It may well be that one reason for our recent dislocations lay in the fact that engineering has momentarily outdistanced the other factors in the business picture, but one does not have to be wild-eyed to imagine all these forces balancing out.

If, as some business commentators have stated, automobiles are now being made with such delicate adjustments and so many wearing parts that maintenance costs will be prohibitive after three or four years' use, this alone would help us solve the problem of used car surpluses. And certainly with greater fuel economy, lower early maintenance expense and the improved performance provided in the cars of today, few motorists would complain because their old cars were worth next to nothing when they got ready to buy a new one.

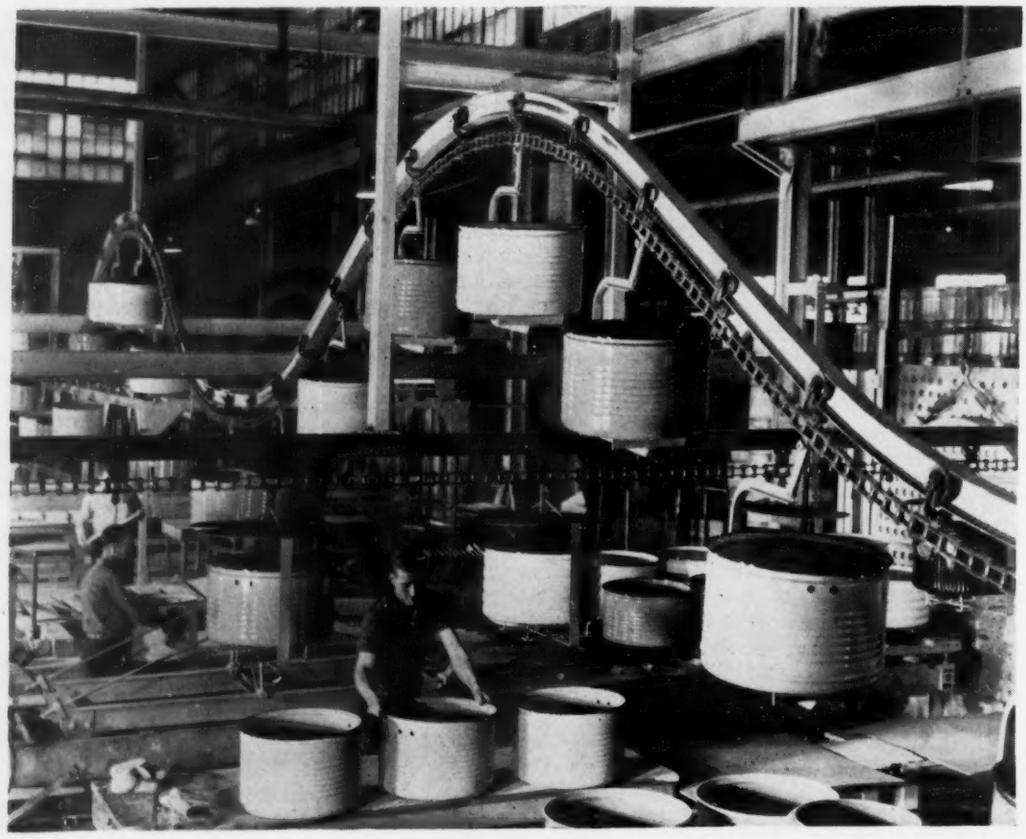


E. J. Kulas
President, Otis Steel Co.
Cleveland

There was a time when most people had every pair of shoes resoled once, twice or three times. Now, the woman who takes advantage of the shoe industry's mass production and modern styling usually finds that it is wiser to buy a new pair than to have the old ones fixed. The fact that the uppers are still good doesn't make any difference, in the face of the resoling cost. True, the shoemaker still has his following, but his soling is more and more on hand-made shoes which cost so much to start with that one hates to part with them. It still takes just about as long to resole a shoe as it did 20 years ago, after power sewing machines had come into general use, and the man who does the work, like everybody else, expects more for his labor and is sure to get it.

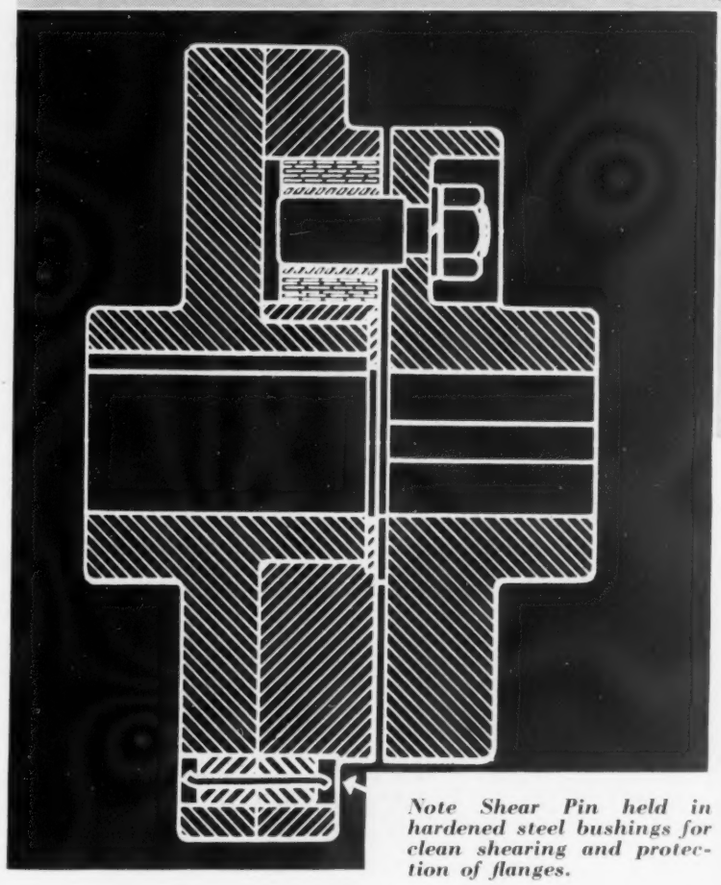
We have to remember that the economies of mass production do not extend very far when you finally get down to maintenance or repairs, and that the lower we can get original prices, the harder it will be to justify anything more than nominal maintenance expenditures.

American industry, through the sheer application of engineering genius, has brought luxuries one after another within range of the average pocketbook so that today it is no longer a question of —



Washing machine tubs are formed from flat sheets in a single piece. Here tubs are getting a porcelain enamel coating on an elaborate materials handling system

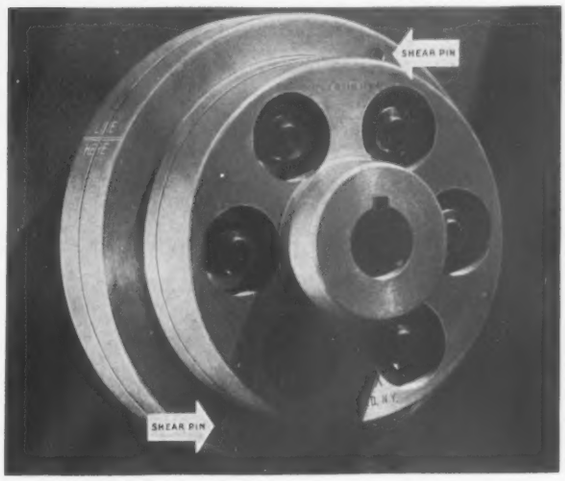
How AJAX Shear Pin FLEXIBLE COUPLINGS



Note Shear Pin held in hardened steel bushings for clean shearing and protection of flanges.

Provide Both Life and Accident Insurance for EXPENSIVE DIRECT CONNECTED MACHINES

Elimination of costly damage and expensive shut downs resulting from accidents or sudden extreme overloads are provided by Ajax Shear Pin Flexible Couplings.



Showing construction of shear pin coupling. Note shear pin holes in the large flange. Sheared pins are easily punched out—replacements made in a few minutes.

Sheared pins can be replaced in a few minutes for a few cents . . . broken shafts, gears and other parts cost dollars and days.

Ajax Shear Pin Flexible Couplings add accident insurance to life insurance. Ajax design gives you rubber cushioned flexibility, positive drive, protection against misalignment, free end float, no noise, no backlash, no lubrication problem. Write for Data Book covering complete line.

AJAX FLEXIBLE COUPLING CO.

4 English St. *Incorporated* *1 9 2 0* **Westfield, N. Y.**

Sales Offices: Akron, Atlanta, Birmingham, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Indianapolis, Kansas City, Los Angeles, Louisville, Milwaukee, Minneapolis, Montreal, New York, Philadelphia, Pittsburgh, St. Louis, San Francisco, Seattle, Spokane, Stuttgart, Syracuse

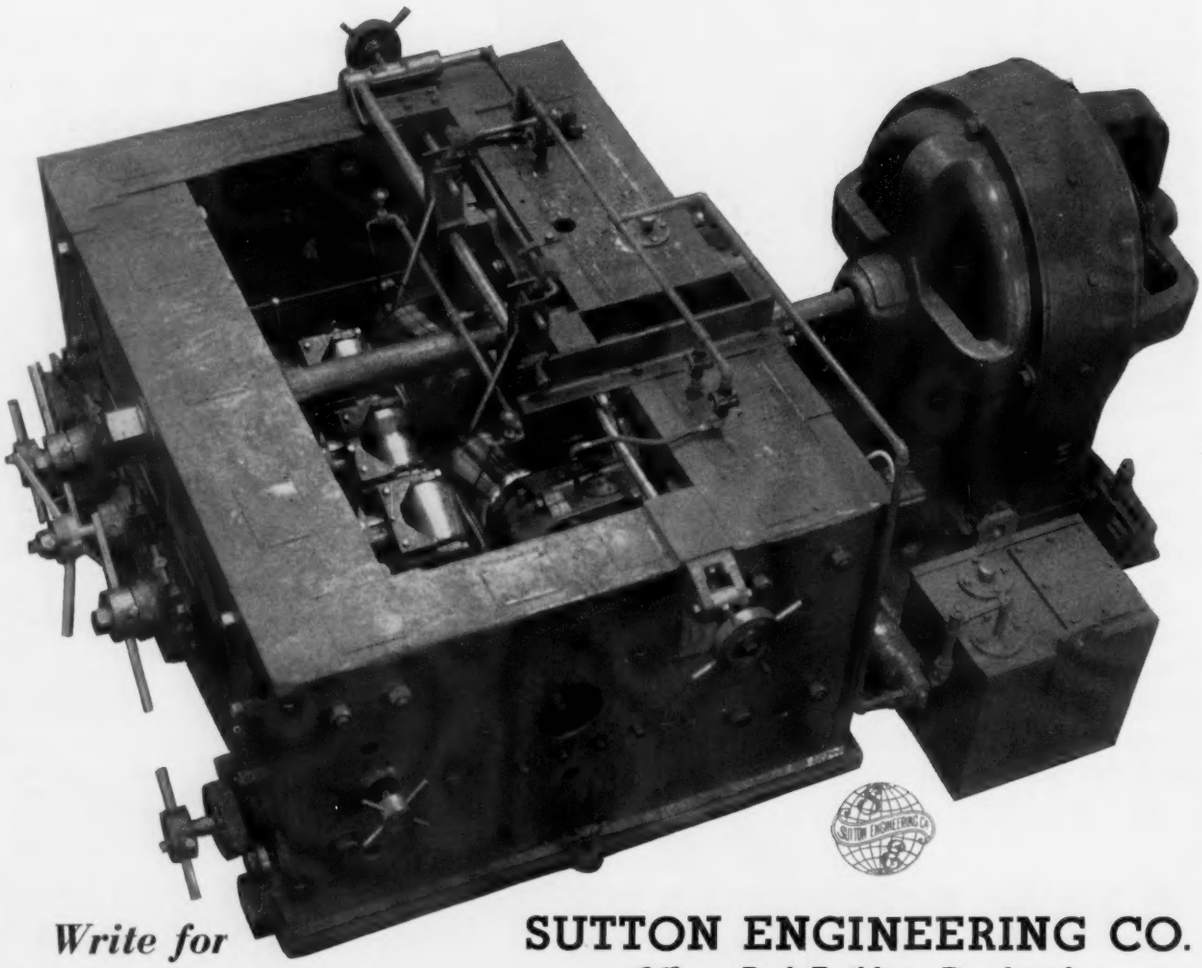
ALSO MANUFACTURERS OF RECIPROCATING DRIVES AND VIBRATORY SCREENS

A REVOLUTIONARY MACHINE

which will SIZE, FINISH and STRAIGHTEN Hot Rolled, High and Low Carbon Steel Bars Rolled to Commercial Tolerances to within .002 of an inch—IN ONE PASS

Another New Sutton Development

No. 1½ B Heavy Duty
Sutton Sizing and Straightening Machine



Write for Complete Details

SUTTON ENGINEERING CO.

Offices: Park Building, Pittsburgh

Works: Bellefonte, Penna.

MOVE MATERIALS with EASE and ECONOMY

—ATLAS—

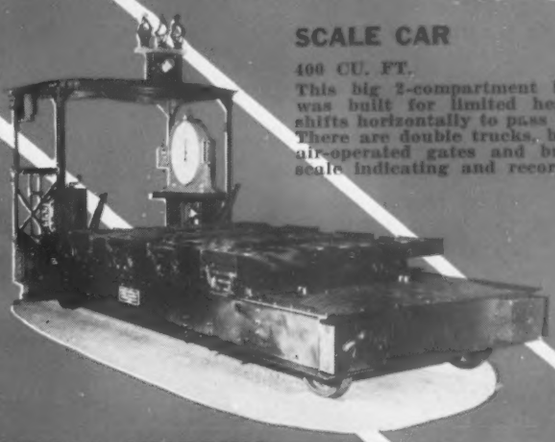
HAULING UNITS for specific purposes are comparable to specialized machine tools in utility and convenience. We have produced dependable hauling equipment for many difficult situations. Whatever your needs may be, see what Atlas offers. It is quite possible problems similar to yours have already been solved.

•

CARS—LOCOMOTIVES
INDUSTRIAL TRUCKS
AND TRACTORS

•

The ATLAS CAR & MFG. CO.
CLEVELAND, OHIO

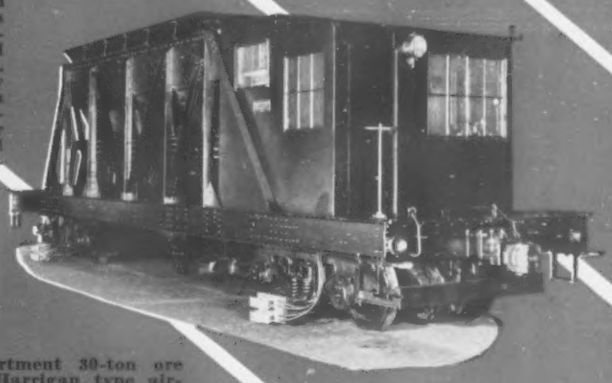


SCALE CAR

400 CU. FT.
This big 2-compartment bottom-dump car was built for limited head-room. It also shifts horizontally to pass between columns. There are double trucks, ball bearings, and air-operated gates and brakes. Has Atlas scale indicating and recording dial.

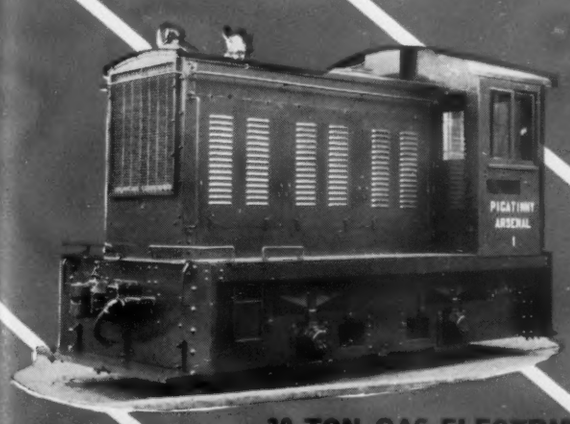
CUPOLA CHARGING

Scale Car, 2½-Ton Roller conveyors for coke and limestone are mounted on the scale. Others for empty buckets and iron (weighed separately), are on the car frame. Atlas Dial scale reads and records ladings.



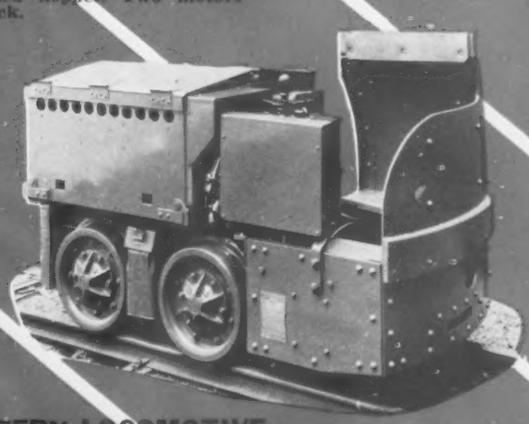
CENTER BOTTOM DUMP CAR

This single-compartment 30-ton ore transfer car has Harrigan type air-operated gates, pusher arm, electrically heated hopper. Two motors for each truck.



30-TON GAS-ELECTRIC

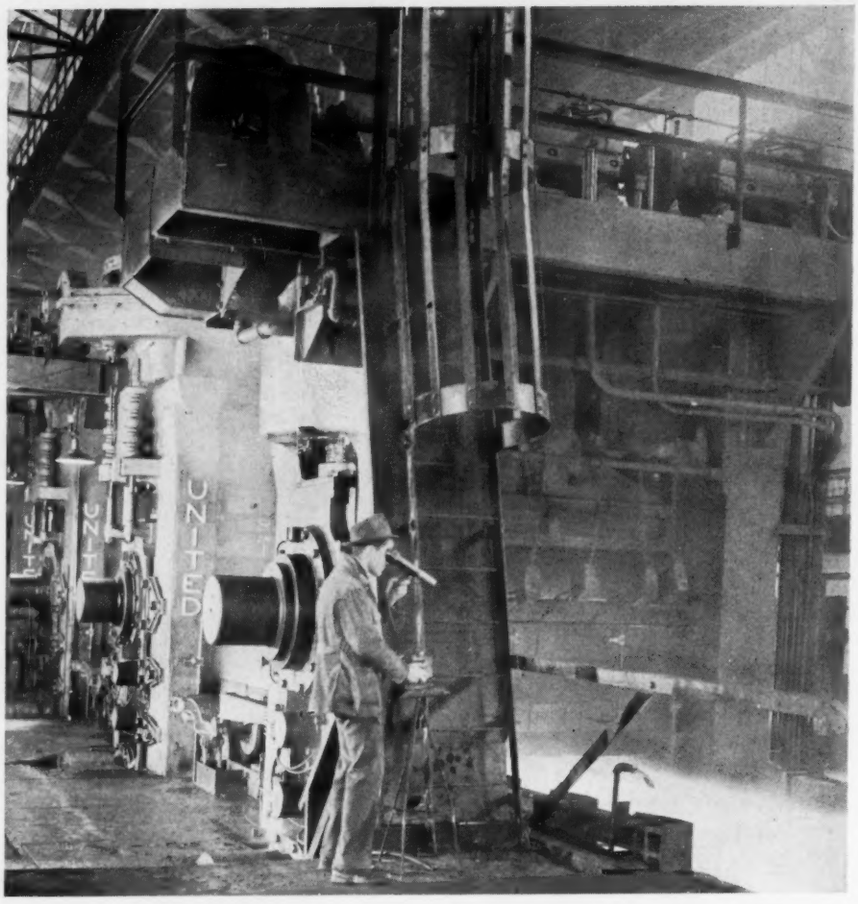
A standard gauge locomotive, with 175 H.P. 6 cylinder engine, generator, two traction motors, and single control A.A.R. engine couplers and Standard Air brake equipment.



BATTERY LOCOMOTIVE

This 1½ ton worm drive locomotive for metal mine haulage. Has safety interlock switch. A cab, with rubber lined head rest, protects the operator.

Recording temperatures of strip steel as it speeds from last pass in Otis Steel Co.'s enlarged 6-stand continuous hot mill finishing line

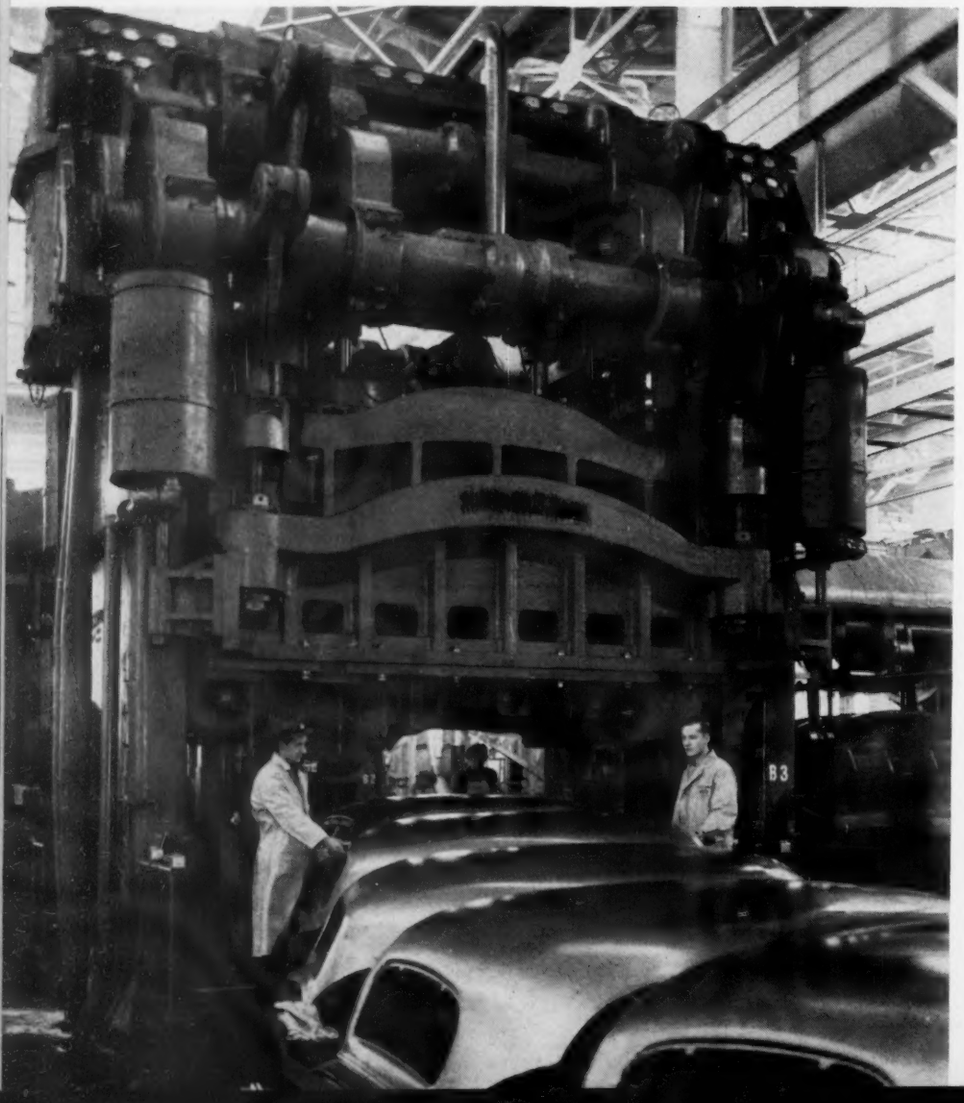


"Does your family have this or that?" but "What kind do you have?". Research and invention directed by these very engineers seem to keep us from ever getting very near a saturation point and it is their responsibility to see that we never do.

With steel's dominant role in the country's industrial development, with steel's untiring pursuit of ever new frontiers, it is logical to expect our engineers to play a leading part in restoring a balance between the nation's productive capacity and its actual consumption. To date, they have probably done more in this direction than any single group in industry to bring efficient agricultural implements within easy reach of the farmer through steels which lend themselves to economical fabrication; to provide tin plate containers which open up a year-round market for his seasonal crops, and to increase the all-around buying power of his dollar by reason of a general impetus to "better quality at lower price" production.

Steel's contribution to the factory worker's lot has been parallel in almost every way; giving the employer better tools and more workable materials so that his men can turn out more and better products which support a better wage, even though they probably sell for less than before. This applies to the refinery hand, the restaurant cook and the truck driver, as well as to the metal worker, though few recognize the fact.

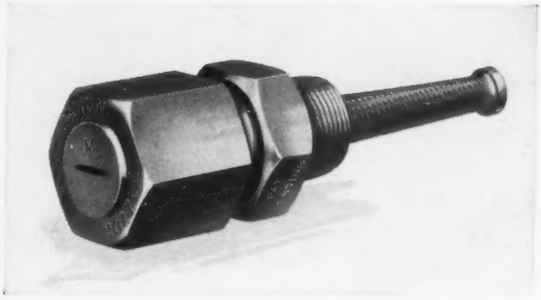
Steel has left its mark on almost every front, but a few remain to be conquered. It performs many important functions in the home of today but is still too small a factor in the building of a house. This represents one untapped market which we recognize but it is only a symbol of many new fields that lie ahead.



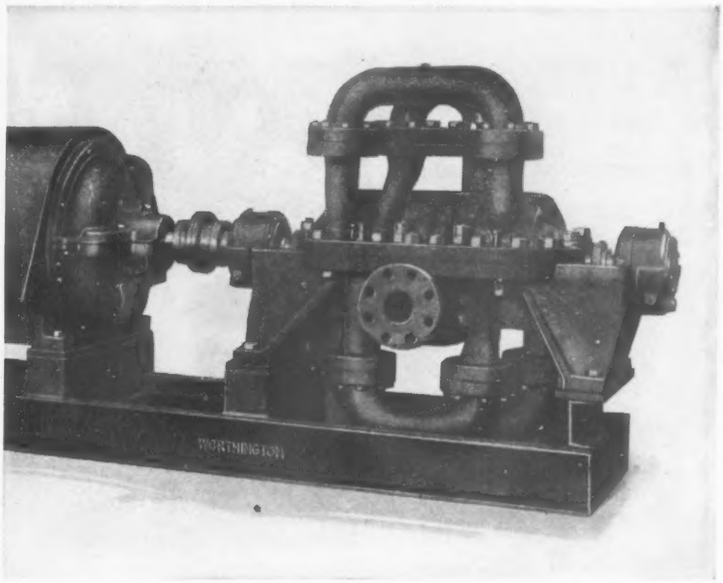
Huge press forming automobile turret type tops

Descaling Systems
for ANY TYPE OF MILL

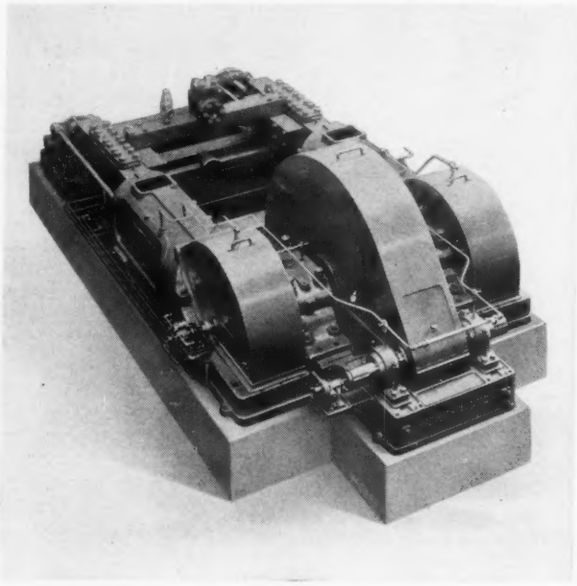
Completely WORTHINGTON EQUIPPED . . .



Worthington Standard Spray Nozzles offer several exclusive features

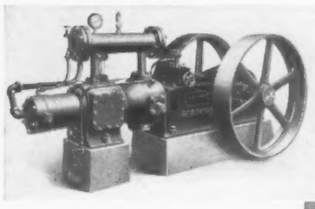


Worthington 6-stage Centrifugal Pump . . . discharge pressures up to 1200 p.s.i.

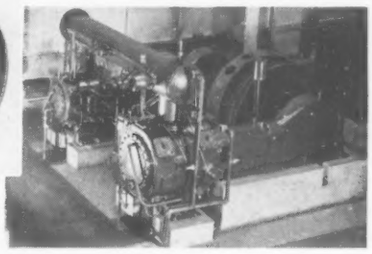


Worthington 3½ x 18 Power Pump . . . discharge pressures up to 3000 p.s.i.

COMPLETE Worthington Descaling Systems assure uninterrupted operation. Worthington equipment includes a wide range of centrifugal and reciprocating pump units . . . air compressors of every type . . . to meet the exact requirements of any mill.



Worthington Single Tandem 2-stage Charging Compressor . . . 1200 p.s.i. discharge pressure



Worthington Duplex 2-stage Compressor motor-driven . . . 125 p.s.i. discharge pressure

ONE MAKER . . . UNDIVIDED RESPONSIBILITY

WORTHINGTON PUMP AND MACHINERY CORPORATION

General Offices: **HARRISON, NEW JERSEY** • *Branch Offices and Representatives in Principal Cities throughout the World*

WORTHINGTON

ATLANTA BOSTON BUFFALO CHICAGO CINCINNATI CLEVELAND DALLAS DENVER DETROIT EL PASO HOUSTON KANSAS CITY LOS ANGELES NEW ORLEANS NEW YORK PHILADELPHIA PITTSBURGH ST. LOUIS ST. PAUL SAN FRANCISCO SEATTLE TULSA WASHINGTON

ICB-19

AISE Program

■ MORE than 5000 steel mill executives and operating engineers of the steel industry are expected to attend the 34th annual convention and Iron and Steel exposition of the Association of Iron and Steel Engineers, which will be held in the Cleveland public auditorium, Cleveland, September 27, 28, 29 and 30, 1938. A comprehensive program has been arranged for the technical sessions, which will be held in the same building as the Iron and Steel exposition. Twenty technical papers will be presented by leading steel mill engineering authorities on the subjects of: Electrical, mechanical, metallurgical, combustion, lubrication, and welding engineering as applied to the greater steel industry. One of the most outstanding men in the steel mill engineering field, Lorenz Iversen, president of the Mesta Machine Co., will be included on the technical program.

Over a hundred manufacturers of steel mill equipment will exhibit their latest designs and products in the annual Iron and Steel exposition sponsored by the Association of Iron and Steel Engineers and held in conjunction with their annual convention. Among the outstanding exhibits will be an animated model of a new seamless tube mill recently installed at Youngstown Sheet & Tube Co.'s Youngstown plant by Aetna-Standard Engineering Co., Youngstown, O. It will actually roll lead pipe from lead billets.

Two inspection trips have been arranged by the society, one to the world's largest and fastest strip mill, Republic Steel Corp.'s new 98-inch continuous hot and cold strip mill; and the other to the Fisher Body plant of General Motors Corp. Both plants are in Cleveland.

Other features of the convention will be an informal dance on the opening night as well as a formal banquet and dance on the closing night. T. M. Girdler, chairman of the board, Republic Steel Corp., will address the members and guests of the association at the formal banquet. Other activities will include social functions for the ladies, such as bridge luncheons and several sight-seeing trips. All social events will be held in the Hotel Statler, Cleveland.

Tuesday, Sept. 27

9:30 A.M.—AUDITORIUM

Electrical Engineering Division

"Study of the Requirements of 440-volt, A-C Motor Control for Steel Mills," by Donald C. Nelson, assistant electrical engineer and J. Russell Powel, general foreman, Jones & Laughlin Steel Corp., Pittsburgh.

"Performance of Slabbing Mill Auxilliary Drives with Ward-Leonard Control," by W. A. Perry, superintendent, electric and power departments, Inland Steel Co., Chicago, and W. B. Snyder, industrial engineering department, General Electric Co., Schenectady, N. Y.

1:30 P.M.—AUDITORIUM

Metallurgical Engineering Division

"Electrolytic Pickling of Strip Steel," by H. W. Neblett, engineer, Inland Steel Co., East Chicago, Ind.

"Pickling of Strip Steel from the Metallurgical Point of View," by H. P. Munger, metallurgist, Republic Steel Corp., Warren, O.

2:30 P.M.—AUDITORIUM

Welding Engineering Division

"Continuous Pickling of Wide Strip Steel with Flash Welding," by L. R. Milburn, engineer, Great Lakes Steel Corp., Ecorse, Mich.

"European Welding Practice and American Trends," by C. H. Jennings, research engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

"Welding as Used in Industrial

STAMCO

SHEET & PLATE MACHINERY

We Specialize in Patented Resquaring Units for

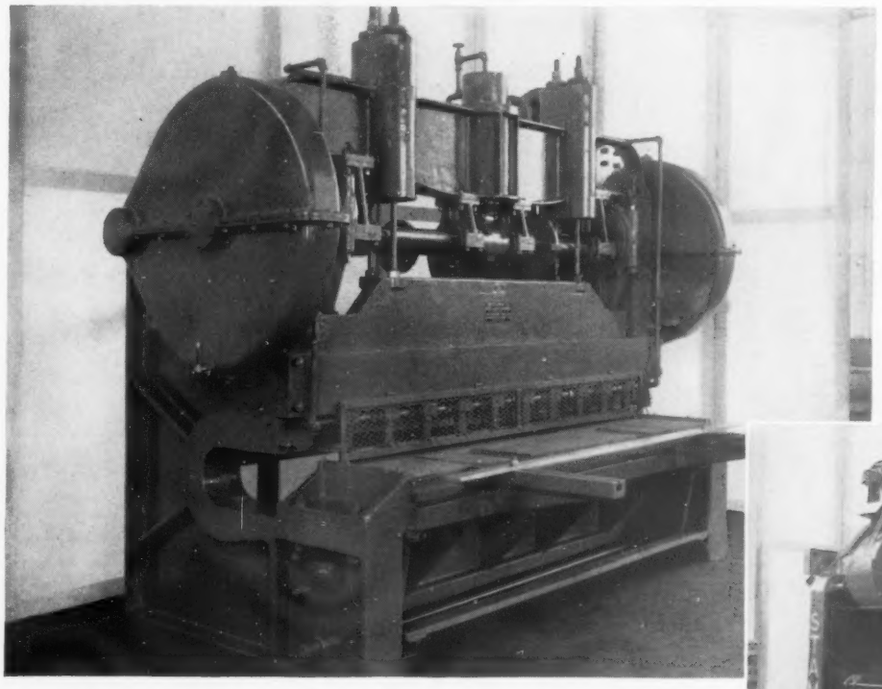
PLATES – SHEETS – TIN PLATE

IN ADDITION A COMPLETE LINE OF MACHINERY FOR SHEET METAL PLANTS

Power Squaring Shears
Power Gap Shears
Gang Slitting Shears
Sheet Mill Shears
Tin Mill Shears

Continuous Mill Shears
Corrugating Rolls
Corrugating Presses
Crimping Rolls
Roofing Presses

Ridge Roll Dies & Presses
Conductor Pipe Machinery
Roll Roofing Machinery
Edgers & Folders
Wahlert Roll Polishers

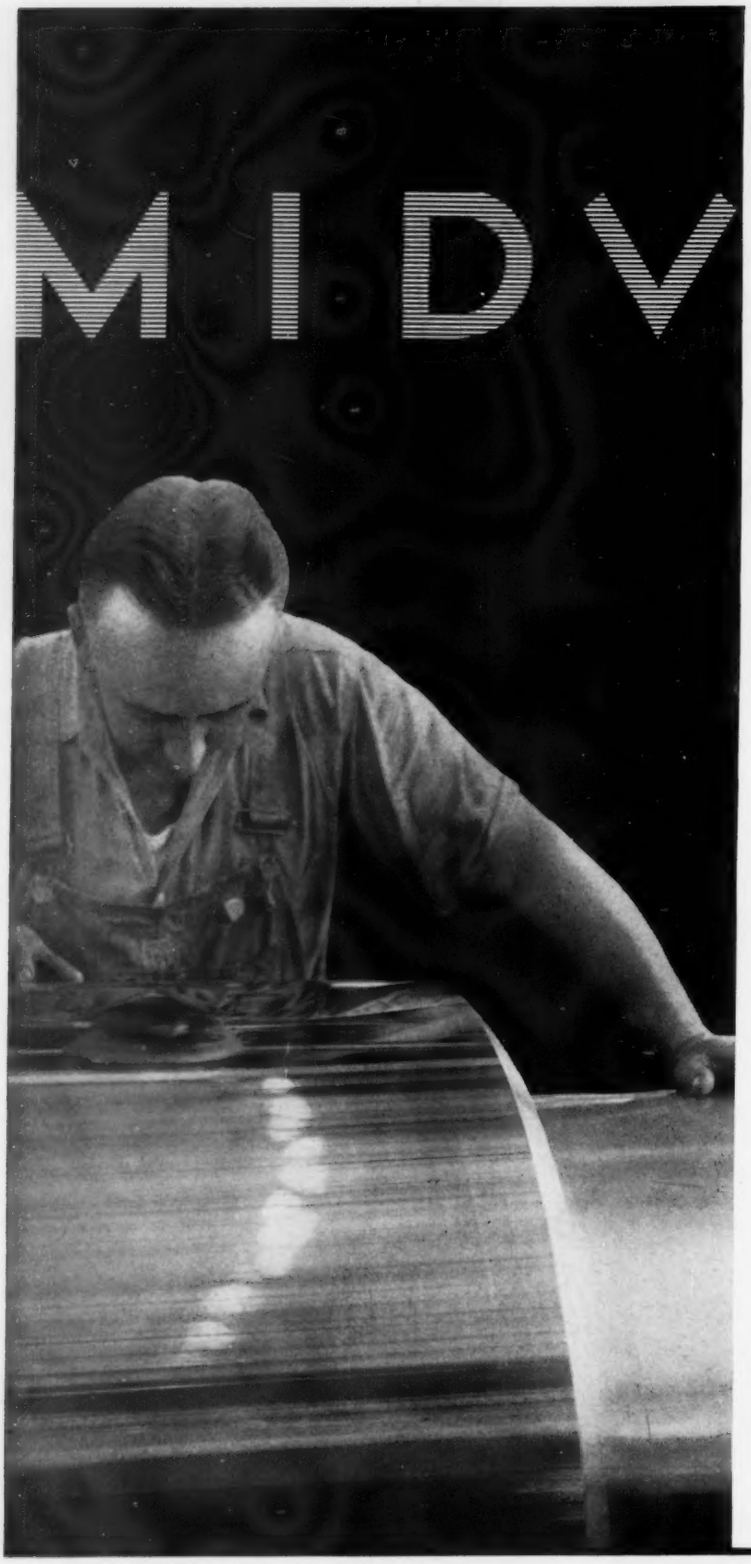


Twin Drive
Air Friction Clutch & Brake
Hydraulic Hold-down

We can furnish Shears in Welded Steel, Cast Steel or Semi Steel Construction, Mechanical Holddown, Hydraulic Holddown, Friction Clutches, Electric Back Gauges.

THE STREINE TOOL & MFG. CO.

NEW BREMEN, OHIO



MIDVALE

Hardened and Ground Rolls

Rods, strips and sheets today may run all the way from low-carbon steel to alloys of unusual toughness or hardness. Rolls for a given purpose may prove entirely inadequate for new demands.

We have solved for many different types of industry varied roll requirements. It is no accident that Midvale hardened and ground rolls have earned a reputation for satisfactory service and long life in many industries.

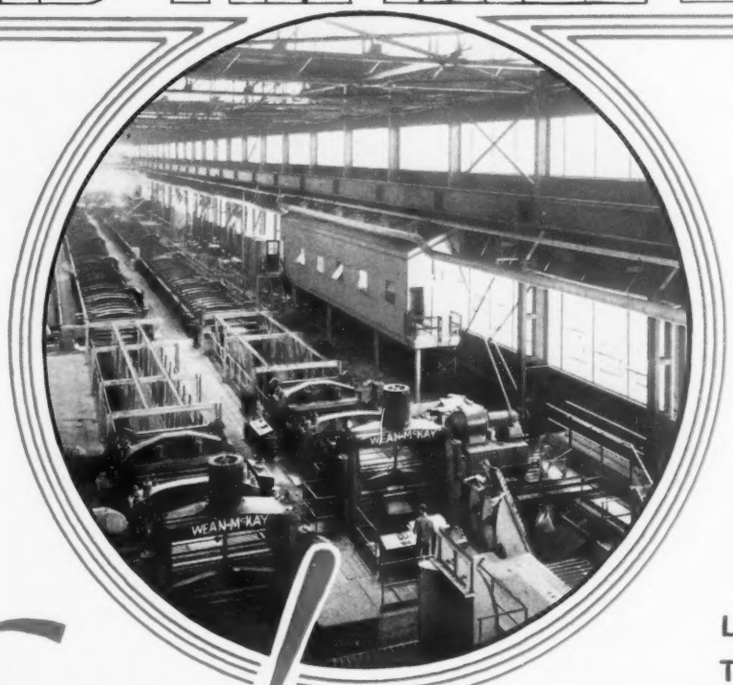
THE MIDVALE COMPANY • NICETOWN • PHILADELPHIA

OFFICES: *New York • Chicago • Pittsburgh • Washington • Cleveland • San Francisco*

The WEAN Engineering Co. Inc.

Warren, Ohio.

SHEET, STRIP AND TIN MILL EQUIPMENT



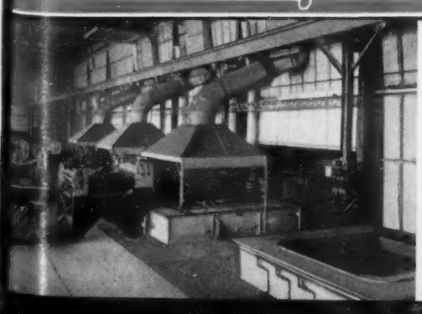
Sure! WEAN EQUIPMENT PAYS DIVIDENDS

Internationally known specialists in mill equipment designed for efficient and economical operation. Wherever possible, Wean equipment is built in the country where it is to be installed.

Let us submit facts and figures whether you need one piece of equipment or a complete plant.

Associated Companies

Lee Wilson Engineering Co. - - Cleveland, Ohio
The McKay Machine Co. - - - Youngstown, Ohio
Flinn & Dreffein Co. - - - - - - - - Chicago, Ill.
Wellman-Smith Owen Eng. Corp., Ltd. - London, Eng.
The Hallden Machine Co. - - - Thomaston, Conn.
The Wean Engineering Co. of Canada, Ltd.



Plants," by Dr. Gilbert Doan, Lehigh university, Bethlehem, Pa.

2:00-5:00 P.M.—HOTEL STATLER

Ladies Card Party and Tea

7:00 P.M.—AUDITORIUM

Visit Iron and Steel Exposition

10:00 P.M.—HOTEL STATLER

Exhibitors' Dance—Informal

Wednesday, Sept. 28

9:00 A.M.—AUDITORIUM

Mechanical Engineering Division

"Finishing Equipment for Wide Strip Mills," by John L. Young, manager, machinery sales, United Engineering & Foundry Co., Pittsburgh.

"Modern Blooming Mill Design," by Lorenz Iversen, president, Mesta Machine Co., Pittsburgh.

1:00 P.M.

Inspection Trip: 98-inch hot and cold strip mill, Republic Steel Corp., Cleveland. Buses will depart from the Cleveland Public auditorium.

2:00 P.M.

Ladies' Sight-Seeing Trip

Thursday, Sept. 29

9:00 A.M.—AUDITORIUM

Electrical Engineering Division

"Acceleration of Tandem Cold Strip Mills," by T. R. Rhea and M. J. Leding, General Electric Co., Schenectady, N. Y.

"A Recent Development of a Low Voltage Rectifier for Industrial Requirements," by G. E. Stoltz, manager, metal working section, and J. H. Cox, manager, rectifier engineering department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

9:00 A.M.—AUDITORIUM

Combustion Engineering Division

"Standardization of Steel Plant Fuel Accounting and Test Procedure for Fuel Consumption Determination," by H. V. Flagg, assistant combustion engineer, American Rolling Mill Co., Middletown, O.

"Oil Burning and Its Control," by A. J. Fisher, fuel engineer, Bethlehem Steel Co., Sparrows Point, Md.

"Use of Mixed Gases for Steel Mill Operations," by E. T. W. Bailey, combustion engineer, Steel Co. of Canada Ltd., Hamilton, Ont.

2:00 P. M.—AUDITORIUM

Lubrication Engineering Division

"Design and Lubrication of Gears and Pinions," by Clark Johnson, manager, gear department, United Engineering & Foundry Co., Pittsburgh.

"American and European Lubrication Practice for Steel Mills," by R. M. Gordon, Gordon Lubricators division, Blaw-Know Co., Pittsburgh.

"New Developments in Oils and Greases Used in E. P. Lubricants," by L. Ballard, supervising industrial engineer, Tide Water Associated Oil Co., New York.

2:00 P. M.—AUDITORIUM

Mechanical Engineering Division

"Design and Operation of the Modern Blast Furnace," by Jake Barrett, Carnegie-Illinois Steel Corp., Youngstown, O.

"Modern Coke Oven Design and Practice," by Fred Denig, vice president, engineering and construction division, Koppers Co., Pittsburgh.

6:30 P.M.—HOTEL STATLER

Formal Banquet and Dance

Friday, Sept. 30

9:00 A.M.

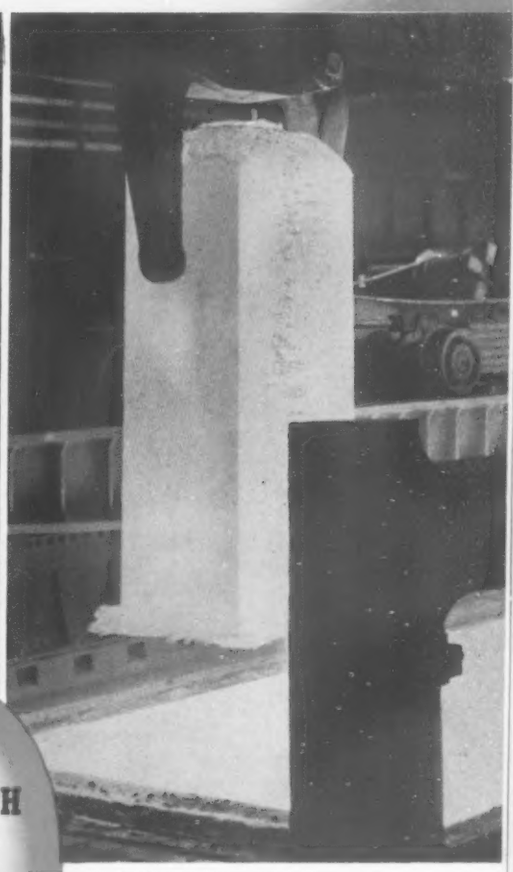
Inspection Trip: Fisher Body plant, General Motors Corp., Cleveland. Buses will depart from Cleveland Public auditorium.

■ **Strip steel is wound into coils like this at speeds up to 2500 feet per minute in coilers underneath the runout table at Republic Steel Corp.'s new 98-inch strip mill which will be opened to visitors on one of the inspection trips planned as part of the convention program**

"Thinks" like an engineer ...acts *instantly!*

CONTROL PANEL for four soaking pits in an important steel mill. Here is regulated with automatic precision the correct correlation of fuel and air.

Visit the
HAGAN BOOTH
SPACE 99
IRON & STEEL EXPOSITION CLEVELAND



A PERFECTLY HEATED ingot being removed from soaking pit. Fine steel is dependent on correct heating. Correct heating is the reflection of correct fuel and air control.

YOU may say we have made a "tall" claim for Hagan Combustion Controls, but for support we can point to leading steel mills and to countless industries where we have solved combustion control problems since we began as pioneers and took the leadership which we have maintained.

On the four principal new types of soaking pits, on slab and billet heating furnaces and open hearth, Hagan regulators have an established reputation for simplicity, sensitivity, stability and reliability. They demonstrate real reduction in fuel costs, a higher rate of heating and a more constant uniformity in results.

Hagan engineers have complete acquaintance with combustion problems and their bearing on steel making operations. They know your requirements and how to obtain them. It's sound engineering practice to "Put it up to Hagan" whenever you face the need for improvement in combustion control. Your inquiries are cordially invited.

THE HAGAN CORPORATION
300 ROSS STREET PITTSBURGH, PA.

HAGAN *Automatic* COMBUSTION CONTROL

The pioneer . . . and still the leader

Exhibitors

LOCATION

Cleveland Public Auditorium

EXPOSITION HOURS

TUESDAY
1:30 P.M. to 5:30 P.M.
7:00 P.M. to 10:00 P.M.

WEDNESDAY
10:00 A.M. to 10:00 PM..

THURSDAY
10:00 A.M. to 5:30 P.M.

FRIDAY
10:00 A.M. to 4:00 P.M.

A

Aetna-Standard Engineering Co., Youngstown, O. ..... Special Exhibit
Alliance Machine Co., Alliance, O. 147
Allis-Chalmers Mfg. Co., Milwaukee 140, 141, 142, 143, 144, 145
Aluminum Co. of America, Pittsburgh 81, 82
American Car & Foundry Co., New York 11, 12
Amsler-Morton Co. Inc., Pittsburgh 6, 7
Askania Regulator Co., Chicago 88
Atlas Car & Mfg. Co., Cleveland 10
Automatic Transportation Co., Chicago 64, 65, 66, 67

B

Baker-Raulang Co., Cleveland 134, 135, 136
Bantam Bearings Corp., South Bend, Ind. 108, 109
Benjamin Electric Mfg. Co., Desplaines, Ill. 102, 103
Blaw-Knox Co., Blawnox, Pa. 120, 121, 122
S. F. Bowser & Co., Ft. Wayne, Ind. 175, 176
Broderick & Bascom Rope Co., St. Louis, Mo. 150
Charles Bruning Co. Inc., New York 4, 5
Bull Dog Electric Products Co., Detroit 118
Bussmann Mfg. Co., St. Louis 83

C

Clark Controller Co., Cleveland 18, 19, 20, 21
Cleveland Crane & Engineering Co., Cleveland 46
Colt's Patent Firearms Mfg. Co., Hartford, Conn. 47
Columbus McKinnon Chain Corp., Tonawanda, N. Y.
Chisholm-Moore Hoist Corp. 173
Crocker-Wheeler Elec. Mfg. Co., Ampere, N. J. 2, 3
Crouse-Hinds Co., Syracuse, N. Y. 27
Cuno Engineering Corp., Meriden, Conn. 125, 126
Cutler-Hammer, Inc., Milwaukee 44, 45, 60, 61

D

De Laval Separator Co., New York 129
Delta Star Electric Co., Chicago 59
Joseph Dixon Crucible Co., Jersey City, N. J. 110

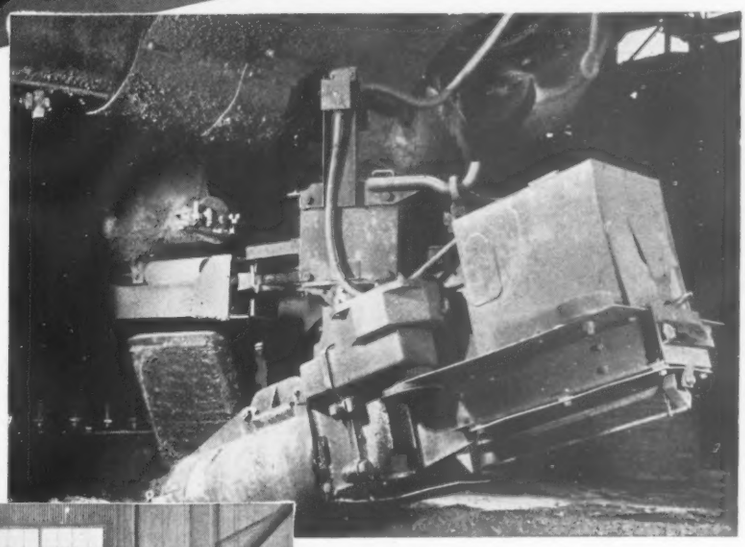
E

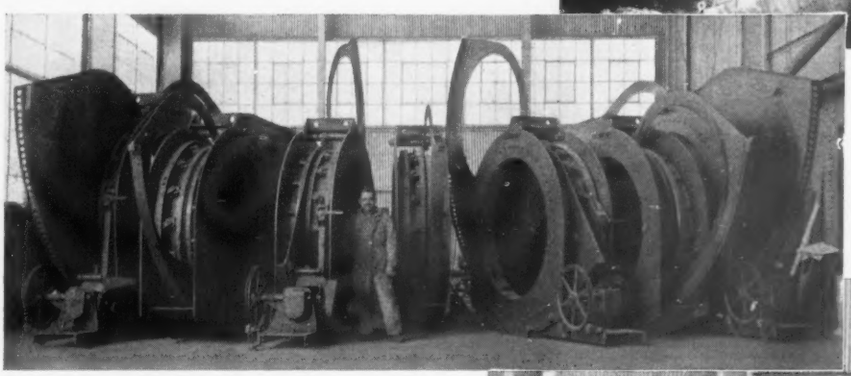
Edison Storage Battery Div. Thos. A. Edison Co.,
Orange, N. J. 9
Electric Controller & Mfg. Co., Cleveland 84, 85, 86, 87
Electrical Engineers' Equipment Co., Melrose Park,
Ill. 89
Electric Storage Battery Co., Philadelphia 117
Elwell Parker Electric Co., Cleveland 148, 149

BROSIUS

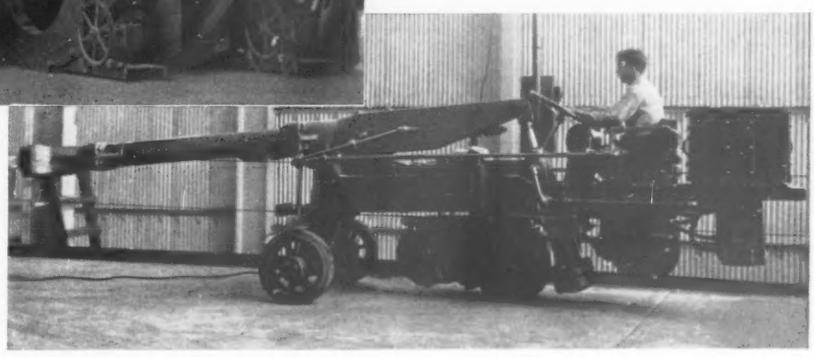
BLAST FURNACE AND STEEL MILL EQUIPMENT

The large number of Brosius machines that have been installed in American and foreign plants are the best recommendation you could have that your operations will gain efficiency and your profits increase by installing them in your own system. Our engineers will welcome an opportunity to go over your problems with you.





TWO-MOTOR ELECTRIC MECHANICAL CLAY GUN—Requires no clamping mechanism and operates instantly when the nozzle enters the tapping hole. Produces more regular operation, constant gas pressure and increases production. No men are required in the danger zone during plugging operations. Nine cubic foot clay barrel provides ample clay for all emergencies. Hole is stopped continuously under full pressure and, if necessary, with the iron flowing full.



AUTOMATIC MOTOR OR HAND OPERATED GOGGLE VALVES—Designed as self contained units, independent of the gas line in their operation. Renewable valve seats are flexible, conforming to any slight distortion of the valve due to stresses in the line. Complete cycle of motor operation requires from 12 to 20 seconds, depending on size of valve. Hand operation takes proportionately longer.

AUTO FLOOR CHARGING MACHINES—This inexpensive, self contained unit requires no tracks or runways. Operates in congested areas and can turn on its own wheelbase. Designed for serving open hearths and similar melting furnaces, for handling slabs, billets, ingots, etc., and for manipulating pieces under hammers and presses.

OTHER PRODUCTS

Steam and Hydro-electric Clay Guns . . . Flue Dust Conditioners . . . Blast Furnace Slag Granulating Machines . . . Soaking Pit Cover Carriages . . . Single Hook Grab Buckets . . . Automatic Dump Buckets . . . Automatic Single Hoist Buckets . . . Overhead Charging Machines for Serving Heating and Melting Furnaces, Etc.

Brosius Equipment is covered by patents allowed and pending in the United States and Foreign Countries

Edgar E. BROSIUS, Inc.

Designers and Manufacturers

PITTSBURGH SHARPSBURG BRANCH PA.

European Distributors Dango & Dienenthal, Siegen, Westphalia, Germany

F

Farrel-Birmingham Co., Buffalo 127
Farval Corp.—Cleveland Worm & Gear Co., Cleveland 130, 131, 132
Fulton Foundry & Machine Co., Cleveland 165

G

Garlock Packing Co., Palmyra, N. Y. 14, 15
Gatke Corp., Chicago 79, 80
General Electric Co., Schenectady, N. Y. 68, 69, 70, 71, 72, 73, 74
Graybar Electric Co. Inc., New York 166
Great Western Fuse Co., New York 77

H

Hagan Corp., Pittsburgh 99
Heppenstall Co., Pittsburgh 23, 24
Hodson Corp. 157
Holophane Co. Inc., New York 111
Homestead Valve Mfg. Co., Coraopolis, Pa. 8
Hyatt Roller Bearing Div. Gen. Motors Corp., Harrison, N. J. 30, 31

I

I-T-E- Circuit Breaker Co., Philadelphia 57, 58
Ideal Commutator Dresser Co., Sycamore, Ill. 146
Iron Age, New York 155, 156

J

Jefferson Electric Co., Bellwood, Ill. 22
Johns-Manville Corp., New York 96, 97

K

Kane & Roach, Inc., Syracuse, N. Y. 119
Keystone Lubricating Co., Philadelphia 1
Koppers Co., Pittsburgh 49, 50

L

Le Carbone Co., Boonton, N. J. 17
Lincoln Engineering Co., St. Louis, Mo. 174
Link-Belt Co., Chicago 75

M

Martindale Electric Co., Cleveland 94, 95
Mesta Machine Co., Pittsburgh 28, 29
Metals & Alloys, New York 168, 169
The Miller Co., Ivanhoe Div., Meriden, Conn. 16
Morgan Construction Co., Worcester, Mass. 112, 114
Morgan Engineering Co., Alliance, O. 92, 93
Morganite Brush Co. Inc., Long Island City, N. Y. .. 43

N

National Carbon Co., Cleveland 38, 39
National Electric Coil Co., Columbus, O. 55, 56

O

Osborne Mfg. Co., Cleveland 177, 178
Otis Elevator Co., New York 139

P

Penton Publishing Co., Cleveland 163, 164
Philadelphia Gear Works, Philadelphia 2, 3
Philco Radio & Television Corp., Philadelphia 133
Poole Foundry & Machine Co., Baltimore 42
Post-Glover Electric Co., Cincinnati 25
Pyle-National Co., Chicago 115, 116

R

Railway & Industrial Engineering Co., Greensburg, Pa. 123, 124
Ready Power Co., Detroit 137
Reliance Electric & Engineering Co., Cleveland 51, 52, 53, 54
Rockbestos Products Corp., New Haven, Conn. 48
Russell & Stoll, Inc., New York 180, 181
Jos. T. Ryerson & Son, Inc., Chicago 138

S

Socony-Vacuum Oil Co. Inc., New York 90, 91
STEEL 163, 164
Steel Publications Inc., Pittsburgh 151
Stewart Warner Corp.—Alemite Div., Chicago 167

T

Texas Co., New York 98
Timken Roller Bearing Co., Canton, O. 106, 107
Tool Steel Gear & Pinion Co., Cincinnati 40, 41
Trabon Engineering Corp., Cleveland 78
Trumbull Electric Mfg. Co., Plainville, Conn. 100, 101

U

United American Bosch Corp., Springfield, Mass. ... 76
United Engineering & Foundry Co., Pittsburgh ... 104, 105

W

Wagner Electric Co., St. Louis 62, 63
Wellman Engineering Co., Cleveland 158
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. 32, 33, 34, 35, 36, 37
Edwin L. Wiegand Co., Pittsburgh 26

Y

Yale & Towne Mfg. Co., Stamford, Conn. 128, 128-A
Youngstown Sheet & Tube Co., Youngstown, O. ..... Special Exhibit

"NORMA-HOFFMANN"

PRECISION BEARINGS

FOR EVERY LOAD, SPEED AND DUTY

108 DISTINCT SERIES

OVER 3000 SIZES

BALL, ROLLER AND THRUST

1/8" to 21" Bore—Metric and Inch Sizes

Write for the Catalog and Engineering Counsel

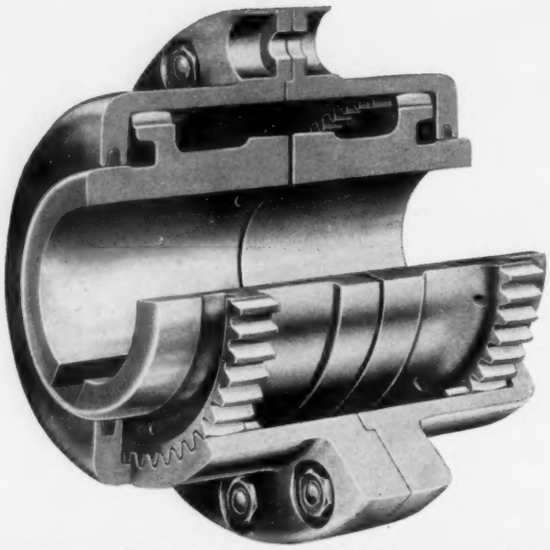
NORMA-HOFFMANN BEARINGS CORPORATION, STAMFORD, CONN., U.S.A.

POOLE *the better* FLEXIBLE COUPLING

FULLY LUBRICATED

DUST PROOF

OIL TIGHT



ALL METAL

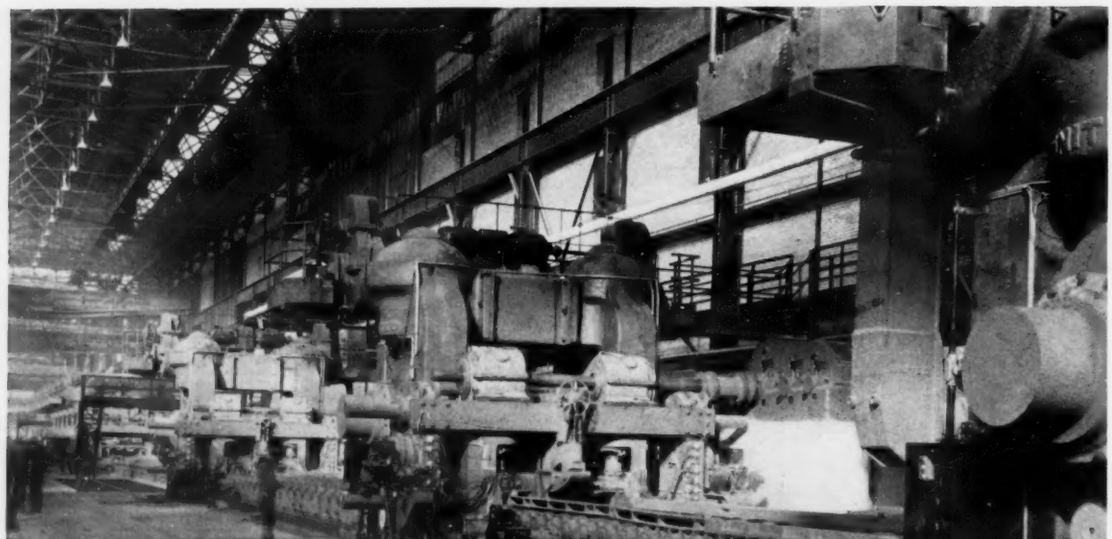
NO WELDED PARTS

FREE END FLOAT

It gives full compensation for the unavoidable errors in alignment or those caused by changes of temperature, wear of bearings, vibration, etc. It also permits free lateral float to connected shafts, and prevents torsional motions. Stronger than the connecting shafts. Capable of sudden reversals at high speed or heavy duty, slow speed drives without strain to the coupling or the machinery it connects. Simple in design, no springs, pins or bushings, self-aligning, silent and vibrationless at all times.

Send for a copy of our

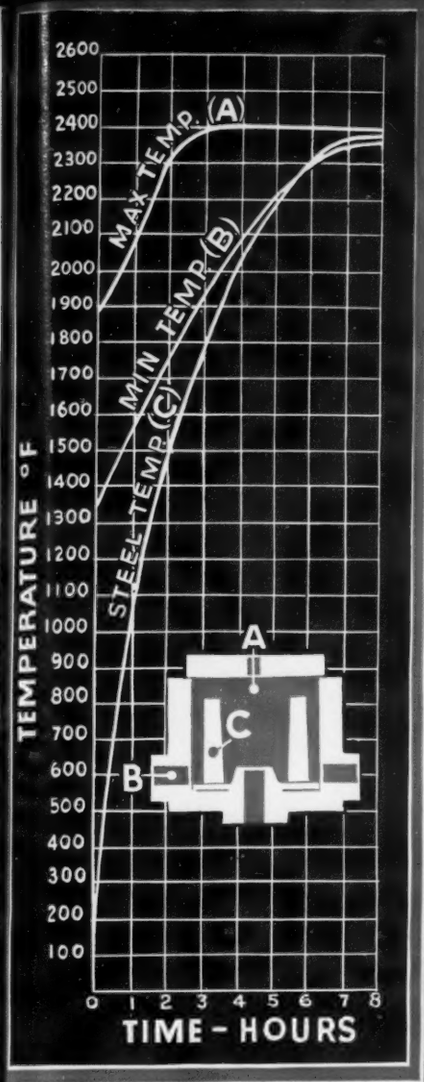
Flexible Coupling Handbook



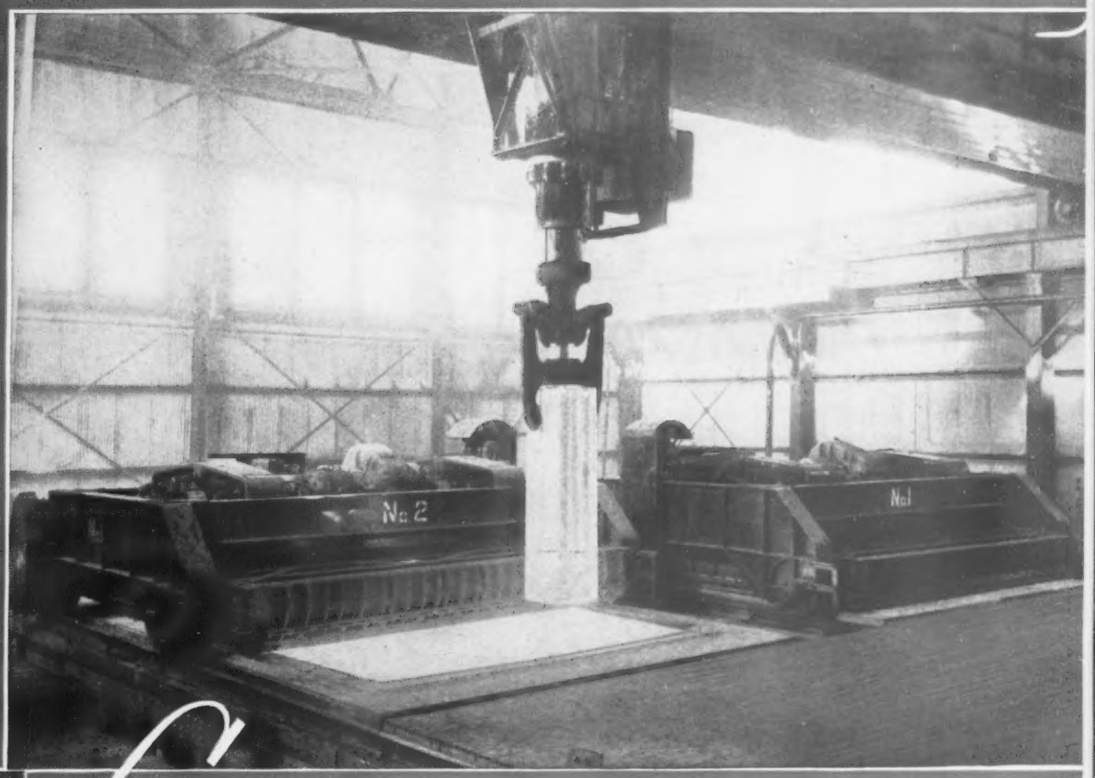
Poole Flexible Couplings in the world's largest steel mill

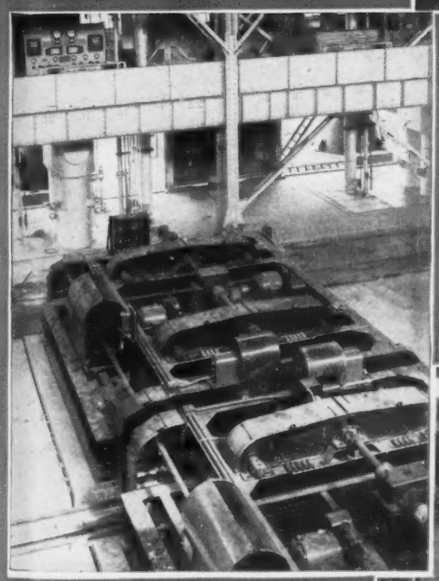
POOLE FOUNDRY & MACHINE COMPANY

BALTIMORE, MARYLAND



The AMCO PIT FURNACE





Complete THERMAL SATURATION ... without washing

UNIFORM HEATING TEMPERATURE FROM TOP TO BOTTOM

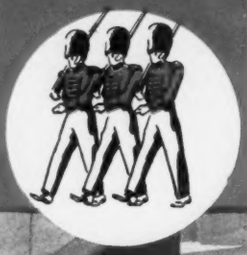
42 BUILT

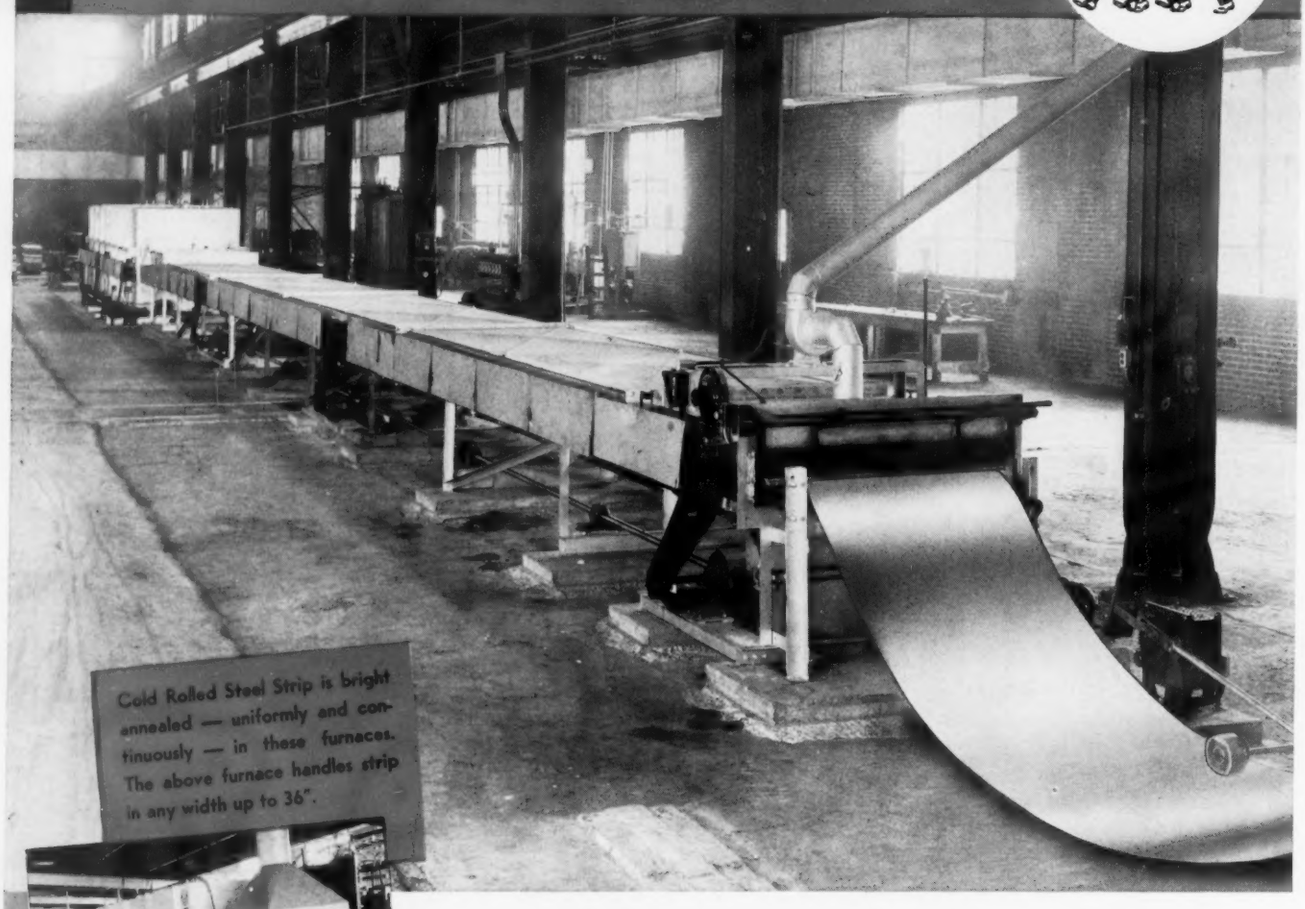
BOOTH NUMBER 6 & 7 AT CLEVELAND EXHIBITION.

The AMSLER-MORTON COMPANY
FULTON BUILDING • PITTSBURGH, PA.

DESIGNERS AND BUILDERS OF INDUSTRIAL FURNACES

absolute uniformity





Cold Rolled Steel Strip is bright annealed — uniformly and continuously — in these furnaces. The above furnace handles strip in any width up to 36".

Another continuous furnace bright annealing six 6" strips of cold rolled steel at once.

Discharge end of another continuous furnace for bright annealing both wide and narrow strip.

Bright Annealed Steel Strip — absolutely uniform in finish and anneal — is produced, continuously, in these special atmosphere bright annealing furnaces.

The finish and anneal are absolutely uniform as the material is annealed in strip form, and is, therefore, subjected to exactly the same temperature and conditions regardless of the tonnage.

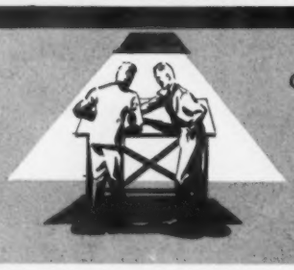
The anneal is secured in a few minutes instead of the usual 24 to 36 hours — requiring less material in process.

Other advantages of continuous annealing include; quicker deliveries because of the shorter annealing time — the complete elimination of pickling — smaller floor space requirements and lower operating costs.

These furnaces can be built in sizes or batteries to handle any width strip or any tonnage required.

Other recent installations include continuous furnaces for bright annealing ferrous and nonferrous tubing, wire, sheet, stampings and other products —continuous furnaces for copper brazing, scale-free heat treating as well as furnaces of various types for normalizing, short cycle malleabilizing, carburizing, billet heating, heating for forging and other processes.

We build Gas Fired, Oil Fired and Electric Furnaces — For any Product, Process or Production. Put your furnace problems up to our experienced engineers.



OUR ENGINEERS WILL BE GLAD TO CONSULT WITH YOU ON ANY OF YOUR FURNACE OR HEAT TREATING PROBLEMS.

the ELECTRIC FURNACE COMPANY

ELECTRIC AND FUEL FIRED FURNACES

SALEM, OHIO, U. S. A.

losses. In ordinary heat treating or annealing furnace, operating at 1400 to 1650 degrees Fahr. these losses average 0.3 to 0.5 kilowatt hours per hour per thermocouple or heat fuse. These include both the losses through thermocouple or heat fuse tile, around the tube where insulation is poorer than elsewhere in the wall, through the protecting tube used and through the thermocouple or heat fuse itself.

2. **Losses around doors.** These losses are very difficult to calculate as they involve leakage of cold air into and hot furnace atmosphere out of the door opening; conductivity through the door jamb which is made of dense fireclay refractories for wear resistance and which running directly into the hot chamber carries out much heat; losses through the heavy metal of the door frame and surrounding castings; losses through the door lining itself which being light for convenience in handling causes much higher losses per square foot than the furnace walls proper.

Usual method of allowing for these losses is to double the values used for remainder of furnace walls. If accurate determination is necessary, the door and its associated parts must each be calculated separately by the formulae given above for R and by methods for computing "through metal" losses described below. These component parts when added together give true total door loss.

3. **Losses due to "through metal" of rolls, pusher rods, or other structural parts.** In general, these parts are made of heat-resisting alloy analyzing either approximately 28 per cent chromium and 12 per cent nickel or 35 per cent nickel and 15 per cent chromium, the balance being iron in either case. They generally run directly from inside of the furnace chamber to outside of wall structure, and hence conduct much heat out from the furnace chamber.

Conductivity of either of these alloys in temperature ranges usually encountered in electric furnace work (up to 1750 degrees Fahr.), is approximately 1.5 watts per square inch per hour per degree Fahr. per inch of length. If, therefore, a 3-inch outside diameter pusher rod projects through a furnace wall 16½ inches thick, with a chamber of temperature of 1600 degrees Fahr. and a room temperature of 70 degrees Fahr. the loss would be

$$L = \frac{\text{Area (sq. inches)} \times (T_1 - T_2) \times K}{\text{Length in Inches}}$$

$$= \frac{3.141 \times 2.25 \times (1600 - 70) \times 1.5}{16.5}$$

$$= 0.98 \text{ kilowatt hours per hour}$$

It is usual to multiply this figure for losses by 1.5 in order to allow for losses around the rod which include air leakage into or out of furnace at this point; black body radiation through the clearance space, if any exists; and heat conducted outward through special tile usually used to form the opening and which often extend all the way through the wall. These losses can be greatly minimized by proper design and particular attention should be paid to this point. Also losses can be reduced by using a hollow tube for the pusher rod, in place of a solid rod. This is usual practice in the design of this part.

Show Actual Losses

To lessen labor involved in calculating total losses curves have been plotted showing actual losses obtained by test on a large number of typical electric furnaces of a wide variety of types and sizes. These curves shown in Fig. 8 involve several assumptions which must be considered before applying the curves. These are:

1. That all furnaces will be insulated in a similar manner, with similar grades of insulating materials, and with their walls, therefore, having thermal resistance values not only similar to the test furnaces but proportional to the operating temperatures. In the curves, the wall thickness of the test furnaces was always approximately equal to the temperature in degrees Fahr. divided by 100. In other words, a furnace operating at a temperature of 1600 degrees Fahr. had a wall 16 inches thick.

It has further been assumed that the walls will be composed of semi-insulating firebrick, backed up by the best available grades of insulating materials, graduated in accordance with the temperatures prevailing in the various parts of the wall, which was the case with all the furnaces tested.

2. That all furnaces will be operated with their doors closed, or open only by an amount sufficient to clear the work passing through the furnace in the case of continuous furnaces. If very large doors, which must be opened frequently, or remain open for a considerable period of time are involved, a special allowance must be made to cover these door losses.

3. That there are no drafts or "stack effects" which might cause large amounts of cold air to be drawn into the furnace, heated and allowed to escape. Where this condition is encountered, due allowance must be made for this loss.

4. That all furnaces operate indoors, in a room or building free from wind or

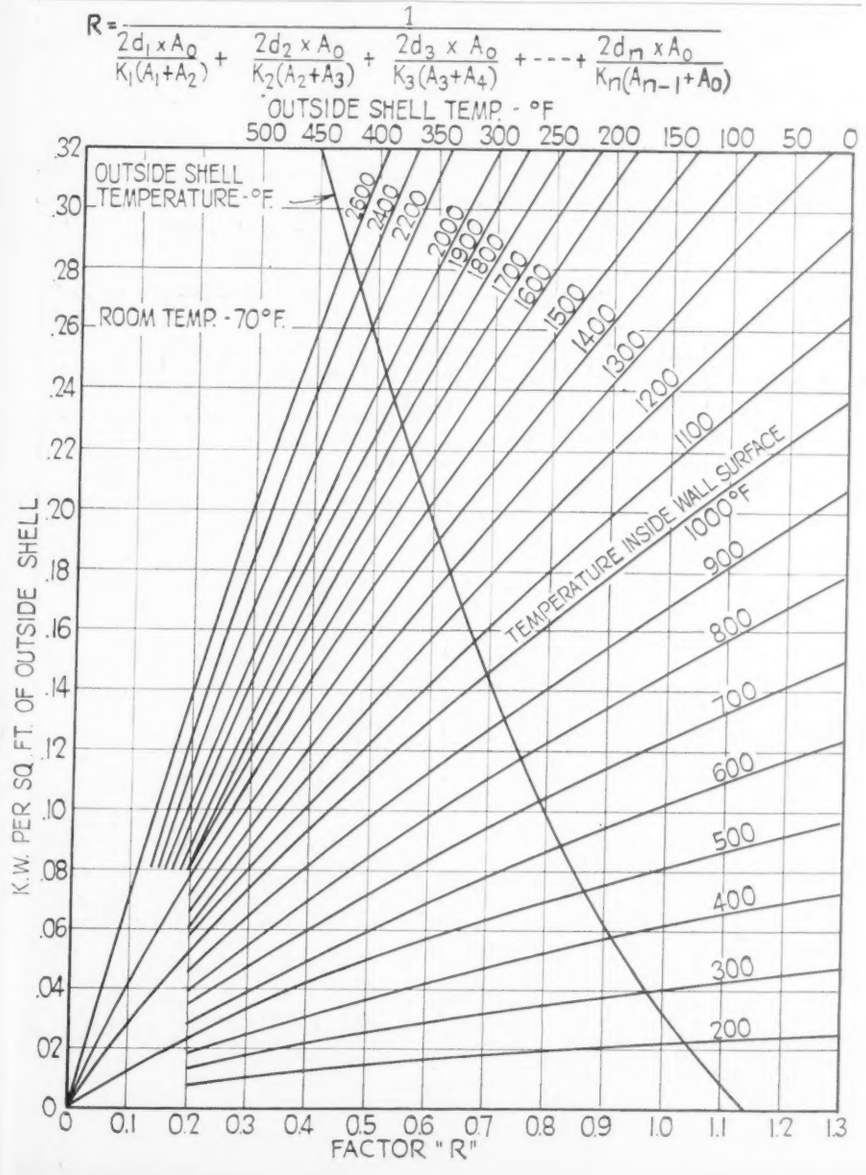


Fig. 6—Heat loss through furnace walls for outside shell temperatures up to 450 degrees

excessive drafts and at a temperature of approximately 70 degrees Fahr.

5. That all furnaces have been operated at temperatures of test for a sufficient period of time to have reached thermal saturation. Length of time necessary to achieve this thermal saturation varies with different furnaces depending upon wall thickness, operating temperature and wall materials. Even the thinnest practical walls usually require 12 hours soaking to reach equilibrium, and it is not unusual in the case of large furnaces to observe the hourly input still dropping 24 hours after the furnace has reached temperature.

In Four Sections

Fig. 8 is divided into four sections, applying to different types of furnaces and operating at different temperatures. Curve No. 1 represents the losses applying to small continuous furnaces, batch furnaces, furnaces having door openings of large area and large loss in proportion to furnace area, and to other special types of furnaces in which the losses are relatively high.

Curve No. 2, Fig. 8, applies to small pit or bell type furnaces, general pusher or conveyor type furnaces, large car furnaces, etc., and represents average fair sized industrial electric furnaces of from 75 to 250 kilowatts connected load.

Curve No. 3, Fig. 8, covers large pit or bell furnaces, or very large pusher, conveyor or roller hearth type furnaces. Since furnace efficiency normally rises as productive capacity increases, this curve applies to any large and hence unusually efficient furnace. It also applies directly to the inherently more efficient types of furnaces such as pit and bell furnaces which are without large door or through metal losses. Like curves 1 and 2, it applies to the temperature range between 1000 and 2200 degrees Fahr.

Curve No. 4, Fig. 8, shows losses for lower temperature furnaces. This particular curve was obtained from tests on medium sized pusher-type furnaces having 9½-inch walls.

The above curves make possible rapid estimation of the probable radiation loss. Since all miscellaneous losses are included, it is unnec-

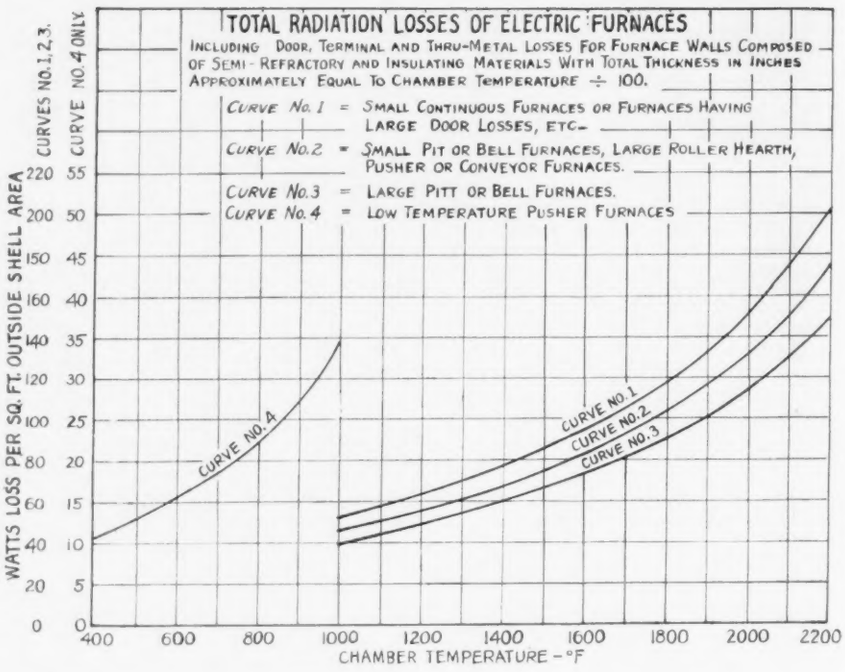
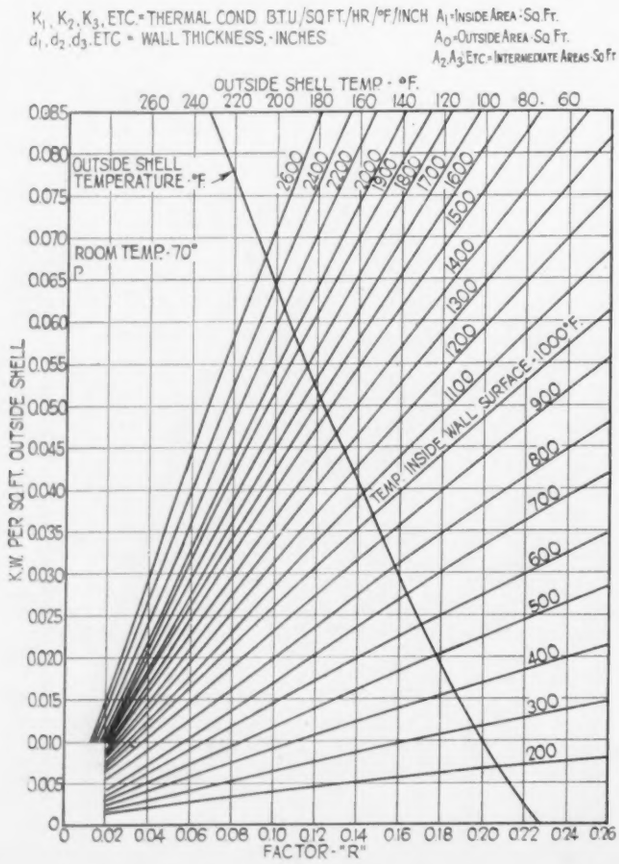

TOTAL RADIATION LOSSES OF ELECTRIC FURNACES
INCLUDING DOOR, TERMINAL AND THRU-METAL LOSSES FOR FURNACE WALLS COMPOSED OF SEMI-REFRACTORY AND INSULATING MATERIALS WITH TOTAL THICKNESS IN INCHES APPROXIMATELY EQUAL TO CHAMBER TEMPERATURE ÷ 100.
CURVE No. 1 = SMALL CONTINUOUS FURNACES OR FURNACES HAVING LARGE DOOR LOSSES, ETC.
CURVE No. 2 = SMALL PIT OR BELL FURNACES, LARGE ROLLER HEARTH, PUSHER OR CONVEYOR FURNACES.
CURVE No. 3 = LARGE PITT OR BELL FURNACES.
CURVE No. 4 = LOW TEMPERATURE PUSHER FURNACES
CURVES NO. 1, 2, 3.
CURVE NO. 4 ONLY
WATTS LOSS PER SQ. FT. OUTSIDE SHELL AREA
CHAMBER TEMPERATURE - °F
CURVE NO. 1
CURVE NO. 2
CURVE NO. 3
CURVE NO. 4

Fig. 8—These curves give total radiation losses—a valuable short cut

Fig. 7—Similar curves for outside shell temperatures up to 230 degrees


K1, K2, K3, ETC. = THERMAL COND. BTU/SQ.FT./HR./°F/INCH
d1, d2, d3, ETC = WALL THICKNESS, - INCHES
A1 = INSIDE AREA - SQ. FT.
A0 = OUTSIDE AREA - SQ. FT.
A2, A3, ETC = INTERMEDIATE AREAS - SQ. FT.
OUTSIDE SHELL TEMP. - °F.
OUTSIDE SHELL TEMPERATURE - °F.
ROOM TEMP. - 70° F.
TEMP. INSIDE WALL SURFACE - 1000° F.
K.W. PER SQ. FT. OUTSIDE SHELL
FACTOR - "R"

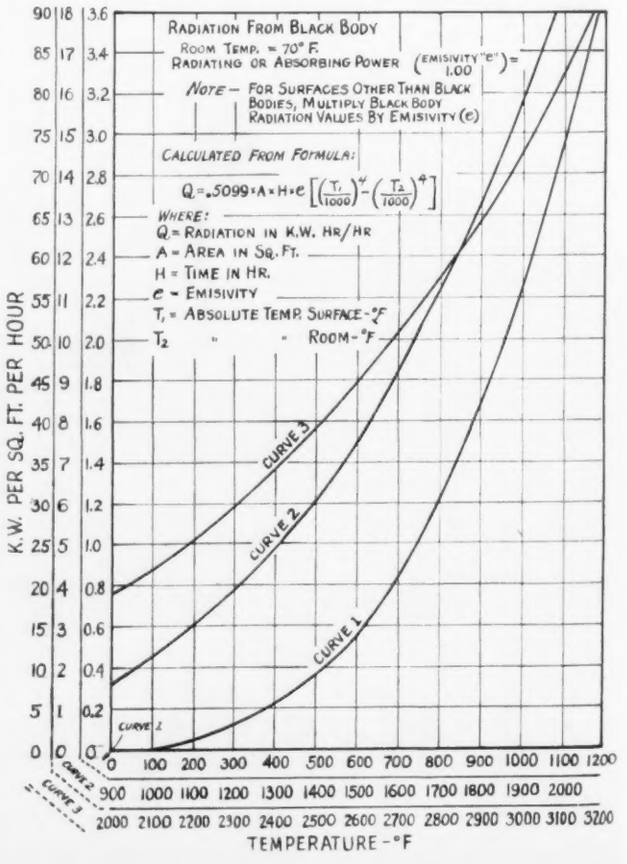
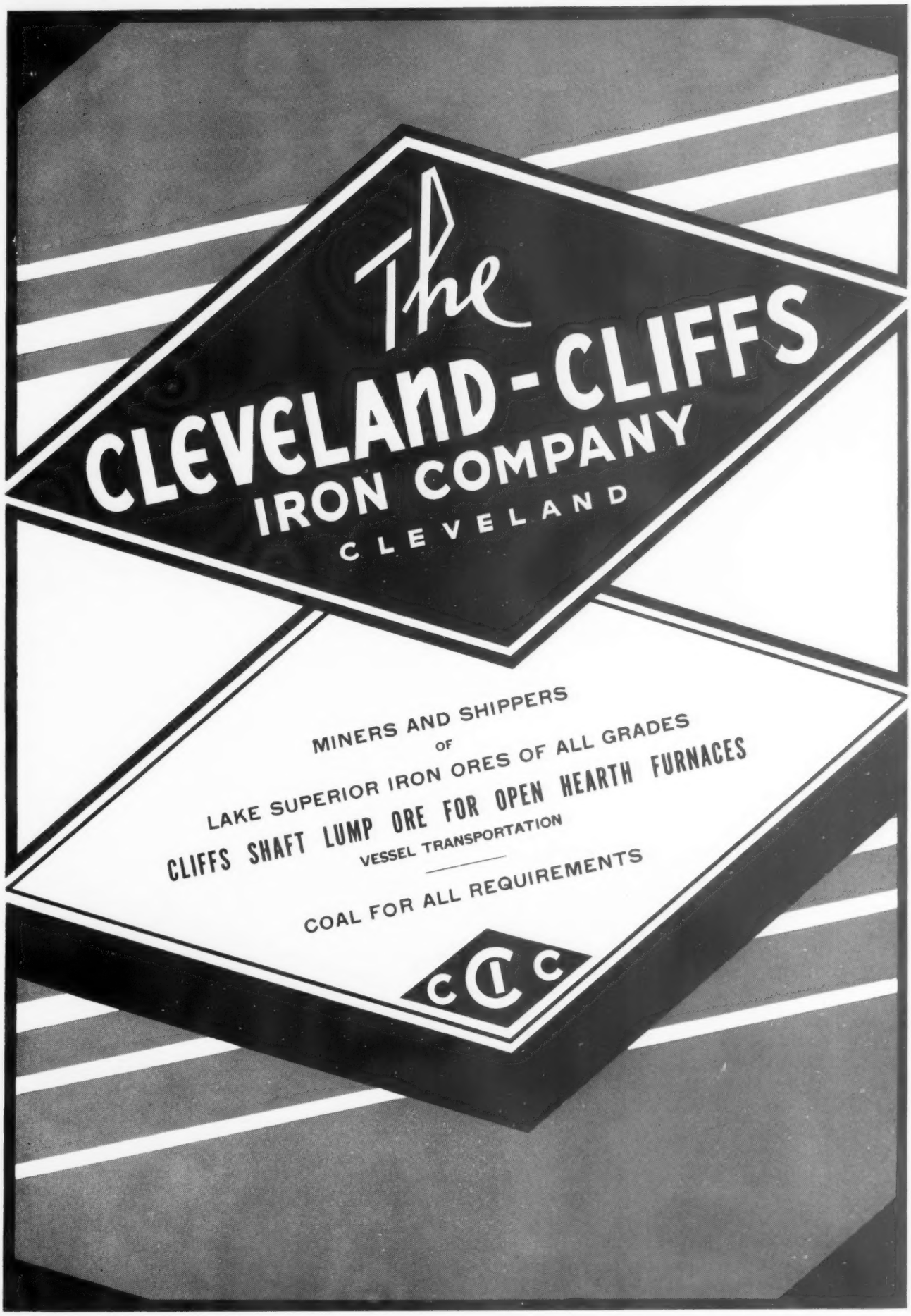

RADIATION FROM BLACK BODY
ROOM TEMP. = 70° F.
RADIATING OR ABSORBING POWER (EMISIVITY "e") = 1.00
NOTE - FOR SURFACES OTHER THAN BLACK BODIES, MULTIPLY BLACK BODY RADIATION VALUES BY EMISIVITY (e)
CALCULATED FROM FORMULA:
Q = .5099 × A × H × e [(T1/1000)^4 - (T2/1000)^4]
WHERE:
Q = RADIATION IN K.W. HR/HR
A = AREA IN SQ. FT.
H = TIME IN HR.
e = EMISIVITY
T1 = ABSOLUTE TEMP. SURFACE - °F
T2 = " " ROOM - °F
K.W. PER SQ. FT. PER HOUR
CURVE 1
CURVE 2
CURVE 3
TEMPERATURE - °F

Fig. 9—Values of black-body radiation losses for temperatures from 100 to 3200 degrees


The
CLEVELAND-CLIFFS
IRON COMPANY
CLEVELAND
MINERS AND SHIPPERS
OF
LAKE SUPERIOR IRON ORES OF ALL GRADES
CLIFFS SHAFT LUMP ORE FOR OPEN HEARTH FURNACES
VESSEL TRANSPORTATION
COAL FOR ALL REQUIREMENTS
CCC

essary to determine various minor items so difficult to calculate accurately but which taken together make up approximately 40 per cent of total losses in the average case. Factors of safety can be reduced or eliminated entirely through the use of this actual test data. Caution should always be exercised in case of furnaces having large door losses or other unusual losses.

Give Door Losses

Door losses, in furnaces where these are a major source of loss, can be obtained from black body curves shown in Fig. 9. These curves give the theoretical black body radiation values in kilowatts per square foot per hour. Values taken from this curve should be multiplied by factors in Table II, taken from "Practical Industrial Furnace Design" by M. H. Mawhinney and giving values to compensate for the "throat effect" or wall thickness factor. The thicker the wall through which heat rays must pass to reach the outside, the greater the portion of those rays which will impinge on the wall and by reflection be prevented from reaching the outside.

Multiplying the black-body loss figure by the proper factor from the table compensates for this effect so true radiation loss results. There is a slight error in results obtained in this manner since it assumes that true black body conditions exist both inside and outside the furnace chamber. This is not strictly correct in all cases. However, experience indicates that it is sufficiently accurate for all practical design purposes.

Additional losses occur, especially with large doors, due to cold air entering at bottom and hot furnace atmosphere leaving at top of door opening. These losses can only be obtained by a careful study of the actual door involved. They vary from 25 to 50 per cent of the black body losses in the case of large doors, based upon the presence of still air in the furnace room. Any draft or wind condition will, of course, increase them enormously.

Where controlled, externally prepared furnace atmospheres are used, these must be heated to furnace temperature and in most cases are discharged without imparting their heat content to the work. Most of the common atmospheres in use for bright annealing or heat treating work, have a specific heat of approximately 0.0186 B.t.u. per cubic foot per degree Fahr. From this value the heat loss due to the atmosphere may be computed through the use of the following formula:

$$H = QS\ (T_1 - T_2)\ /3412$$

where H is heat loss in kilowatt hours per hour; Q is quantity of gas heated, cubic feet per hour; S is specific heat of gas being heated; T_1 is chamber temperature, degrees Fahr.; T_2 is entering gas temperature degrees Fahr. Thus, if 3000 cubic feet of gas per hour is required to maintain a deoxidizing atmosphere in a furnace chamber, gas entering at 70 degrees Fahr. and furnace chamber being at 1700 degrees Fahr. loss will be:

$$H = 3000 \times 0.0186 \times (1700 - 70)/3412$$
$$= 26.6 \text{ kilowatt hours per hour.}$$

Often all of the gas is not admitted into heating chamber but a portion is admitted near discharge door of the cooling chamber and is not heated. Then this heat loss should be computed using only that portion of total atmosphere supplied which actually is admitted to heating chamber and heated there.

Assumes Hot Walls

All above figures have been based upon furnace being held at working temperature sufficiently long to permit walls to reach thermal equilibrium. This almost always requires 12 hours and large furnaces or those with unusually heavy walls may require longer. It should be mentioned, however that the largest part of the heat required for saturation is supplied much earlier. Degree of saturation may be checked by observing the kilowatt-hour input for successive hourly intervals. Saturation will be evidenced by this value becoming substantially steady or by its reaching the true radiation value, if known.

Heat storage in refractories may be computed by the following formula:

$$H = W\ S\ (T_2 - T_1)\ /3412$$

where H is heat storage in kilowatt-hours; W is weight of refractories in pounds; S is specific heat, B.t.u.'s per pound per degree Fahr.; T_1 is temperature of refractories at start, degrees Fahr.; T_2 is temperature in refractories (mean) after heating.

Specific heat of refractory materials varies somewhat with the particular material and temperature but a value of 0.25 B.t.u. per pound is sufficiently accurate for most furnace calculations. Weight of fire clay refractories varies somewhat with analysis of the clay, and methods of manufacture. However, a value of 140 pounds per cubic foot is approximately correct for most materials.

Semirefractory insulating firebrick differ in weight as made by different makers and in accordance with the temperatures for which they are suited. In general, the higher the temperature, the heavier the brick and the greater its thermal conductivity. Weights vary from 2.5 to 3.0 pounds per standard 9-inch brick, or from 42.5 to 51 pounds per cubic foot.

Insulating materials used for backing up inner furnace lining likewise vary widely, from 21 pounds per cubic foot for packed diatomaceous earth powder to 34 pounds per cubic

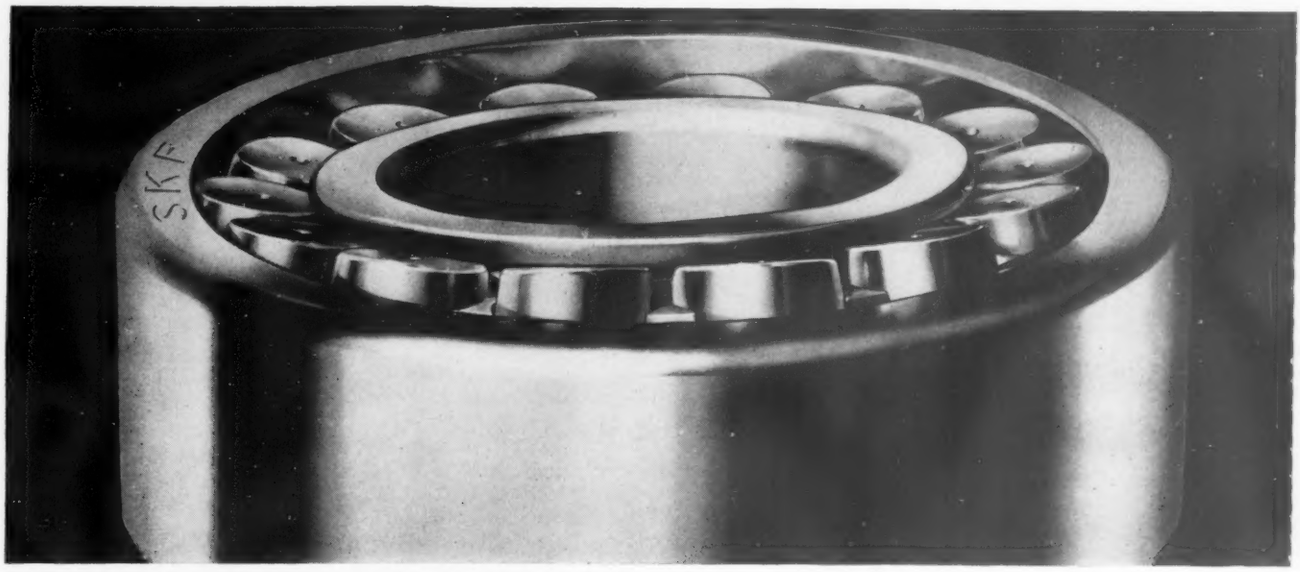
Table II

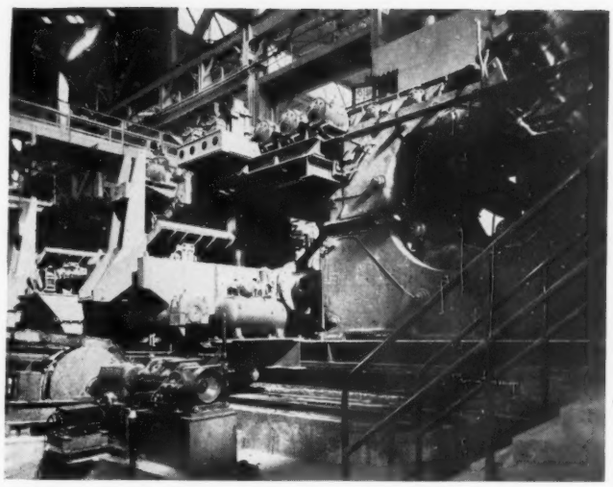
Multiplication Factors to be Used in Obtaining Actual Radiation from Direct Radiation Values of Black Body Curve in Determination of Door Losses

From "Practical Industrial Furnace Design," by M. H. Mawhinney

Wall Thickness Inches	Width of Opening, Inches	Height of Opening, Inches 6	12	18	24	30
4½	6	0.56	0.63	0.68	0.68	0.69
	12	0.63	0.67	0.73	0.76	0.78
	24	0.68	0.76	0.80	0.82	0.84
	36	0.71	0.79	0.83	0.85	0.87
	48	0.72	0.81	0.85	0.87	0.89
	60	0.73	0.82	0.86	0.89	0.91
9	6	0.43	0.49	0.52	0.55	0.56
	12	0.49	0.56	0.60	0.63	0.64
	24	0.55	0.63	0.67	0.70	0.72
	36	0.57	0.66	0.70	0.73	0.75
	48	0.59	0.68	0.72	0.76	0.78
	60	0.61	0.69	0.74	0.77	0.79
13½	6	0.36	0.42	0.45	0.47	0.49
	12	0.42	0.48	0.52	0.55	0.57
	24	0.47	0.55	0.59	0.62	0.64
	36	0.50	0.58	0.63	0.66	0.69
	48	0.52	0.60	0.65	0.68	0.71
	60	0.53	0.61	0.66	0.70	0.72
18	6	0.31	0.36	0.39	0.42	0.43
	12	0.36	0.43	0.46	0.49	0.51
	24	0.42	0.49	0.53	0.56	0.58
	36	0.45	0.52	0.57	0.60	0.62
	48	0.47	0.55	0.59	0.63	0.65
	60	0.48	0.56	0.61	0.64	0.67

The BEARING *that* TOUGH JOBS *have made* FAMOUS





● *Tension rolls of large coilers, made by United Engineering & Foundry Co. for a 98" mill, move on SKF Spherical Roller Bearings.*

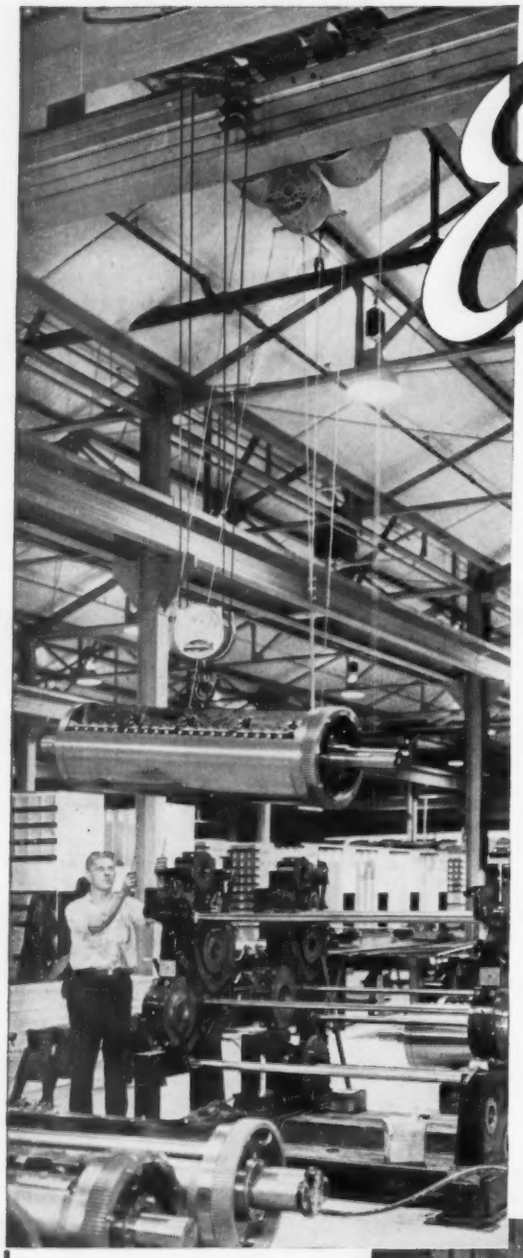
It's on the giant coilers of the world's largest strip mill

Here's one bearing you'll always find on a tough job. It's an SKF Spherical Roller Bearing.

Whether it's taking the tremendous loads imposed on back-uprolls . . . assuring perfect alignment on big gear reduction drives . . . or keeping rotating parts of coilers moving freely, it "takes it". That's why well-informed steel men everywhere say, "If it's a tough job, it's an SKF job."

Self-aligning, self-contained, the SKF Spherical Roller Bearing assures an equalized load distribution insuring full bearing capacity and long life. No wonder it's the first choice of men who want a "tough job" bearing. SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa. 4186

SKF
Roller Bearings



Eyes Right!

...Economically...

With Type H Mercury Lamps

"Eyes Right" is the first command in planning for modern industrial operations. Executives know that *good seeing,* night and day, is a prerequisite to good workmanship . . . that it aids accuracy, cuts accidents and ends the nervous tension that comes from eye fatigue.

Today, when the problem is to insure good seeing without a high premium in energy costs, there's an equally clear-cut command for the higher light output of General Electric Type H Mercury Lamps. Dollar for dollar, these high-efficiency light sources furnish brighter, safer seeing conditions, which provide greater eye comfort and clarity of fine detail.

Why not have complete facts on General Electric Type H Mercury Lamps at your fingertips? Write either address below for further information on the savings you can make with these high-efficiency light sources.

GENERAL ELECTRIC

896H

General Electric Vapor Lamp Co.
885 Adams Street, Hoboken, N.J.

Incandescent Lamp Department
Dept. 165, Nela Park, Cleveland, Ohio

The 400-Watt Type H Mercury Lamp has a higher light output per watt than any other light source practical in industry. Its rated operating life is 2,000 hours.

The General Electric auto-transformer has been designed specifically for use with the General Electric Mercury Lamp. Order this auxiliary equipment from the General Electric Vapor Lamp Company.

foot for synthetic diatomaceous earth and asbestos base materials. Reference should be made to the published weight tables as supplied by maker of the particular material being used and these values employed.

To determine heat storage in furnace walls, roofs, etc., it first is necessary to determine radiation losses by the formula for calculating R and using Figs. 6 and 7. From these calculations, mean temperatures in each layer of insulation, at saturation, can be determined. These values are substituted in the second formula given above for H to obtain the heat storage.

Refractory Heating

For refractory parts subject to heating from all sides, especially those made of fire clay materials such as piers on car tops or in bottom of furnaces, heat storage can generally be assumed to equal that involved in raising the entire mass of refractory to furnace temperature as these parts generally are heated throughout.

For refractory parts subject to intermittent heating such as car bottoms, bases for bell furnaces, etc., values for heat storage obtained above usually are too high as these parts often never reach saturation due to short time of exposure to heat. Their percentage saturation must be determined through a careful study of the individual case, bearing in mind that 50 per cent of the total amount is usually absorbed within the first four hours of exposure. A value of 60 per cent of saturation has given fairly accurate results when used in cases of 6 to 10 hours exposure within the furnace chamber on parts composed of insulation and semi-insulating materials.

Alloy parts subject to heating and cooling can be treated in a manner similar to the brickwork, except that such parts are practically always heated throughout. The second formula for H therefore applies with T_2 becoming the total temperature in the metal. Specific heat of alloys commonly used in furnace work over temperature ranges generally encountered is 0.16 B.t.u. per pound per degree Fahr.

Heat required by work being heated may be obtained rather simply through the second formula for H using the proper specific heat for the material being heated. However, since specific heat is not quite a constant for various temperatures, particularly in materials having critical points and since heat absorbed by the work is such an important part of total energy consumed, some more exact method is desirable.

Also, it is convenient to have the heat content stated in terms of kilowatt-hours per 100 pounds for various materials at various temperatures. Fig. 10 shows heat content of materials most commonly heated in electric furnaces in terms of kilowatt-hours per 100 pounds at various temperatures.

In using these curves, care must be taken to DEDUCT from heat content at final temperature, the content at start of heating cycle, usually 70 degrees Fahr. Where furnace receives work hot from some previous operation, due recognition also should be taken of this fact.

Economy of an electric furnace generally is defined as the consumption of electrical energy in kilowatt-hours per ton of material heated. It also is sometimes stated in terms of pounds of material heated per kilowatt-hour of energy consumed. Total power consumption as determined through methods described in this paper will consist of the sum of the following: Total radiation loss, door losses (if not included in total radiation loss), heat to refractories (if furnace cools between heats), heat to alloy parts (if heated and cooled), gas atmosphere loss (if any is used), heat to the work.

To Figure Economy

This sum divided into pounds of work produced per hour will give the economy in pounds per kilowatt-hour. The kilowatt-hours per ton figure is obtained by dividing 2000 by the economy in pounds per kilowatt-hours.

Average values of economy as obtained in typical industrial electric furnaces are as follow: Heat treating at 1400 deg. Fahr. 190 to 200 kilowatt-hours per ton; normalizing forgings at 1650 degrees Fahr., 200 to 210 kilowatt-hours per ton; drawing at 750 degrees Fahr., 145 kilowatt-hours per ton; sheet normalizing at 1720 degrees Fahr. 195 kilowatt-hours per ton; annealing steel strip in bell furnace 145 to 190 kilowatt-hours per ton; copper annealing in bell furnace, 24 pounds per kilowatt-hour; copper annealing in continuous furnace, 20 to 24 pounds per kilowatt-hour; copper annealing in continuous recuperative furnace 30 to 35 lbs. per kilowatt-hour.

Variations Expected

The above values are average ones. However, considerable variations occur in practice due to differences in the type of conveyor used, the form in which the material reaches the furnace and the size unit involved. These differences are especially pronounced where either exceptionally large or exceptionally small units are involved. In every case, however, the principles of calculation and design outlined above can be applied to determine in advance the fuel consumption to be expected from a given unit, or to locate the reason for some unusually high or low value encountered.

Curves presented here may somewhat lighten the labor of calculation. The quick estimating methods and shortcuts recommended have been tested and have proved accurate and helpful in many years experience.

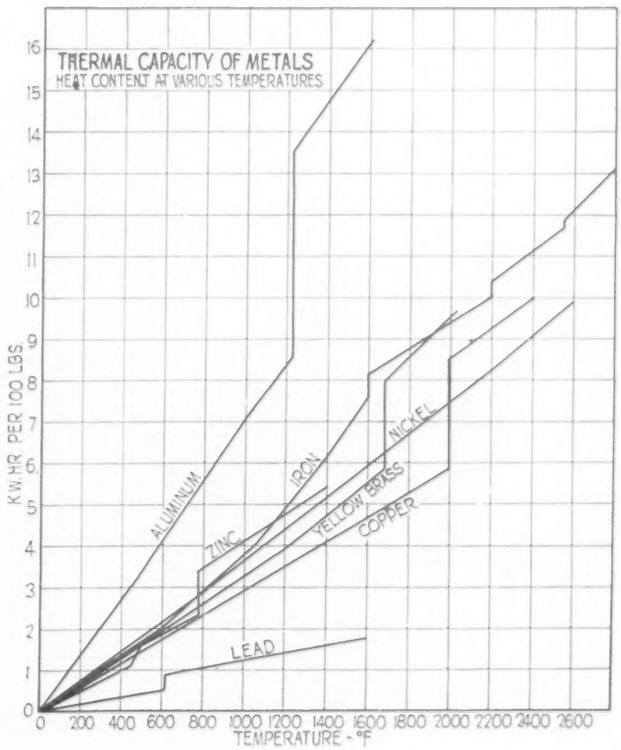


Fig. 10 — Heat contained by metals at various temperatures

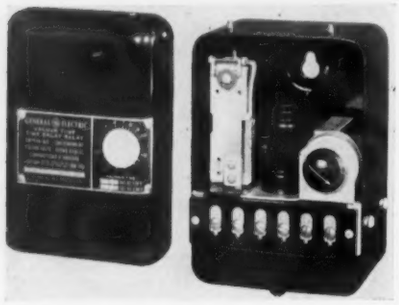
Industrial Equipment

(*Continued from Page 86*)

sheets in 2 minutes, one man doing the job in a single operation. Corner locks can be produced at rate of 30 feet per minute. Medium size machine handles 20-gage and lighter material, and the heaviest model handles 18-gage.

Vacuum Tube Timer For Machine Tools

■ General Electric Co., Schenectady, N. Y., has devised a general purpose vacuum tube timer for ap-



plication to industrial machinery which requires a definite time delay.

Electronic portion of this device consists of a General Electric 6C5 three-element, high-vacuum metal tube, which can be replaced easily through any radio supply dealer.

Timer is arranged to operate on either 115 or 230 volts, and 50 or 60 cycles. Contact tips are rated one ampere at 115 volts and 0.5 ampere at 230 volts. It is calibrated with a scale having 10 divisions proportional to time.

Grinds Carbide Tools

■ Carboloy Co., 2967 East Jefferson avenue, Detroit, has announced a bench type tool grinder designed

for sharpening of cemented carbide tools in sizes up to 1-inch square, or equal cross section, on diamond wheels and lapping disks.

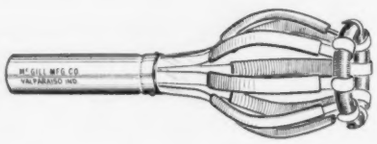
Graduated dial permits accurate angular adjustment of table to maintain correct rake and clearance angles with keen cutting edges and smooth tool faces. Large adjustable tool rest table is mounted across face of wheel with slot provided for a tool guide protractor, making it possible to grind angles on a tool without checking by hand protractor. Distance from wheel to tool rest is adjustable, offering maximum support to tool while sharpening. Forward and reverse rotation of wheel is controlled by switch located at front of machine.

Standard 6-inch plain cup or straight diamond wheels or special cup diamond wheels coated on face and periphery can be used on this grinder. Cast iron lapping disks also can be used. Electrical equipment includes ¼-horsepower reversible motor, which turns at 1725 revolutions per minute.

This grinder is built by Ex-Cell-O Corp., Detroit, and is available at $125 from either this company or Carboloy Co.

Removes Tightest Lamps

■ McGill Mfg. Co., Valparaiso, Ind., has announced a new lamp changer with powerful coil-spring gripper



that removes tightest fitting lamps from positions out of reach by hand.

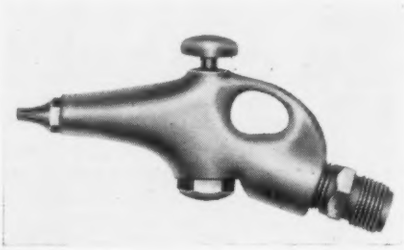
In addition, device can be used to remove street series lamps which have catches to hold them in their sockets. Changer is made in four head sizes to facilitate handling lamps ranging in size from 15 to 1000 watts. It is furnished in either straight or angle adjustment.

Air Gun Is Die Cast

■ DeVilbiss Co., Toledo, O., has announced a compact air dusting gun, which is small enough to be held completely within the hand and yet has an air capacity equal to that of a large standard duster.

Duster is operated by closing hand around gun in any reasonable position, squeezing thumb button and valve stem located at middle of gun body. Removable brass nozzle is threaded into body, which is a zinc die casting. Exterior parts of gun are dull nickel plated, and air valve spring is cadmium plated.

High pressures from main air line or lower pressures may be used in operating duster, which has an air consumption of 13 cubic feet at 80 pounds pressure. This dusting gun is used to blow chips away from metal-working machines, to evaporate solvents in cleaning operations,



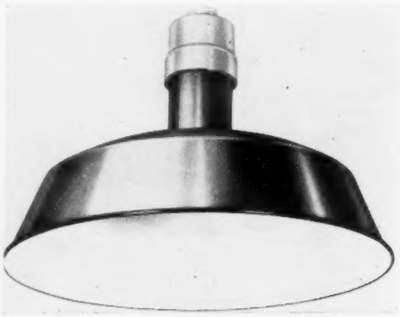
for final cleaning of surfaces before finishing, and in other applications where air dusting is efficient.

Locking Device Speeds Reflector Installation

■ Lighting division of Westinghouse Electric & Mfg. Co., Edgewater park, Cleveland, recently has introduced the Locklite principle of attaching industrial reflectors, which speeds installation, reduces maintenance and provides increased safety with interchangeability of reflector units.

Each Locklite unit consists of two parts, a hood and a receptacle into which reflector with lampholder fits. With this device it is impossible to light lamp until reflector is properly locked into place. When lugs on neck of reflector lock into slots of hood, electrical connection is made. This is accomplished by giving reflector a clockwise turn of 60 degrees. A counter-clockwise turn releases reflector and lamp for cleaning and replacement.

Hood is installed permanently. Re-



flector with lampholder is attached only after all wiring has been completed.

Screw Driving Unit Has Adjustable Tension

■ Stow Mfg. Co., Binghamton, N. Y., has placed on the market a portable screw driving and nut setting machine, which can be equip-

REPRESENTATIVES

New York, N. Y.
Wm. C. Dickey

Pittsburgh, Pa.
McKee-Oliver, Inc.

St. Louis, Mo.
Hubbell & Sharp

San Francisco, Calif.
W. S. Hanford

Boston, Mass.
Edward H. Lloyd

Houston, Texas
The Corbett-Wallace Corp.

Seattle, Wash.
National Steel Sales, Inc.

Los Angeles, Calif.
Ducommun Metals & Supply Co.

Cleveland, Ohio
E. F. Bond

Detroit, Mich.
H. L. Sevin

Portland, Oregon
National Steel Sales, Inc.

Montreal and Toronto, Canada
Drummond, McCall & Co., Ltd.

WHY LOOK FARTHER?

WORTH

Here's the right sheared steel plate for your purpose . . . a quality product, always metallurgically and physically uniform . . . supplied through Representatives conveniently located . . . shipped speedily by land or water.

It's WORTH sheared steel plate.

WORTH STEEL COMPANY • Claymont, Delaware

ped with special pulleys for grinding and polishing.

Assembly is furnished with a heavy 4-caster base mounting, or can be supplied in a suspended type mounting. Swivel arm is counterbalanced, with motor at one end and handpiece with its flexible driving cable at the other.

Handpiece operates with a positive clutch which is in engagement only when screw driver blade is in contact with screw. Screws and nuts may be driven to any desired tension by tightening drive belt.

Motor ratings vary from ¼ to 1-horsepower, and shaft speeds range from 600 to 350 revolutions per minute, according to size of screw or nut being driven.

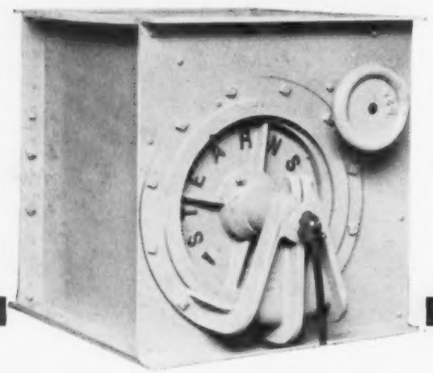
Press Control Is Photo-Electric

■ Electronic Control Corp., 2667 East Grand boulevard, Detroit, has announced new projector and receiver units for its Curtain of Light photo-electric press control equipment.

Mounted in cast aluminum cases and offering an improved optical system, these units are more easily installed than former equipment. Projector uses three 32-candlepower bulbs to project a curtain of light 12 inches in height and 2 inches in thickness. Receiver embodies amplifying circuit with self-contained tube for voltage regulation of phototubes. It has special optical system consisting of three plano-convex condensers, which focus light received from projector on the photo-electric cells.

Originally introduced as a safety device in press operation, this photo-electric equipment has found application in automatic control of various presses that are equipped with either pushbutton control or suitable clutch-brake mechanism to stop press during its closing cycle.

CONTINUOUS PRODUCTION and a PURE PRODUCT



A STEARNS Magnetic Separator is your cheapest and best insurance against the deadly and costly menace of tramp iron. The amount of junk removal from raw materials in the course of manufacture is almost unbelievable.

The STEARNS Type "LS" shown above, provides fully enclosed, dusttight, automatic, fast and positive protection at low cost. It is only one of the many designs of better engineered magnetic separators available for protection, purification or concentration in dry or wet application.

Consult the largest, exclusive builders of magnetic equipment with close to forty years of practical pioneering experience.

Ask for our catalogs. Outline your problem.

Stearns Magnetic Mfg. Co.
650 So. 28th St.
Milwaukee, Wis.

HIGH STEARNS DUTY

Agitating Device Is Operated by Air Motor

■ Eclipse Air Brush Co., 390 Park avenue, Newark, N. J., has placed on the market an air-motor operated agitator, designated as Pneumix type B, for handling batches of material up to 100 gallons.

Outstanding feature of this stirring device is its safety. It is sparkproof and cannot heat. Speed is controlled by air intake on motor and

is variable from 30 to 6000 revolutions per minute, requiring from 5 to 50 pounds air pressure. Propeller blades throw toward each other, providing splashproof performance, and a muffler in exhaust line assures quiet operation.

Shaft is available in chromium-plated steel, stainless steel or bronze; blades in chromium-plated brass or stainless steel. Shaft is re-

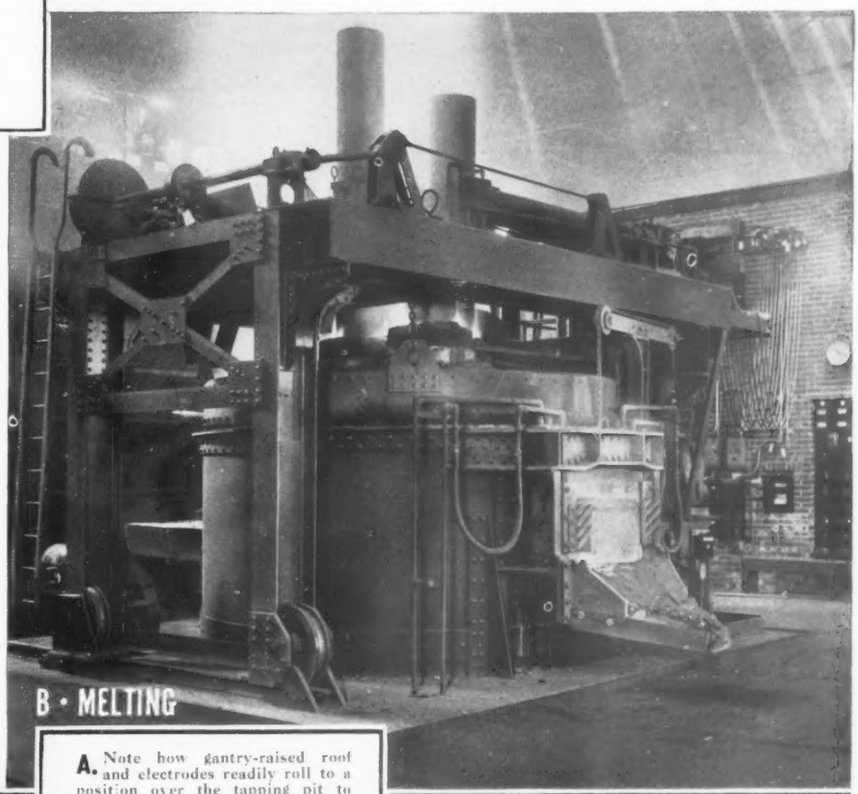
Now..5 NEW MAJOR FEATURES IN *Heroult* ELECTRIC FURNACES

1. Gantry-type removable roof.
2. Improved welded-type roof coolers.
3. Improved wedge-type electrode holders.
4. Water-cooled, current-carrying copper tubing arranged to prevent hysteresis and eddy current losses.
5. Attached floor, tilting with shell when pouring.

THESE, and other recent innovations, give you an efficient, modern production tool with excellent metallurgical and low-cost operating performance.

Heroult Electric Furnaces have gained a remarkable reputation by efficient melting and refining of ferrous materials — alloy, tool, and stainless steels; iron or steel castings. These improved furnaces are sturdily built with simple, effective tilting mechanisms. Dependent on size and operating requirements, they are adaptable to hand, chute, machine or drop-bottom bucket charging. Capacities range from ½ to 100 tons.

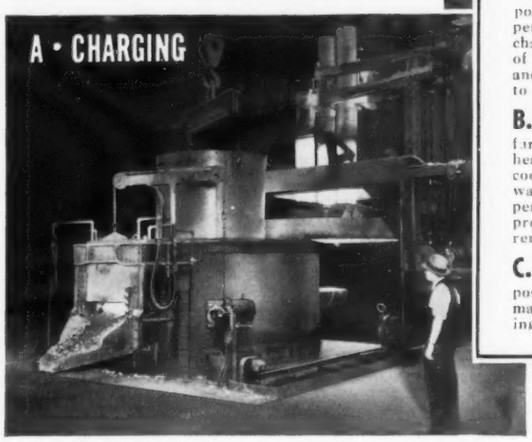
To meet your specific requirements, American Bridge offers complete facilities for design and construction of these unusually efficient, easily operated electric furnaces.

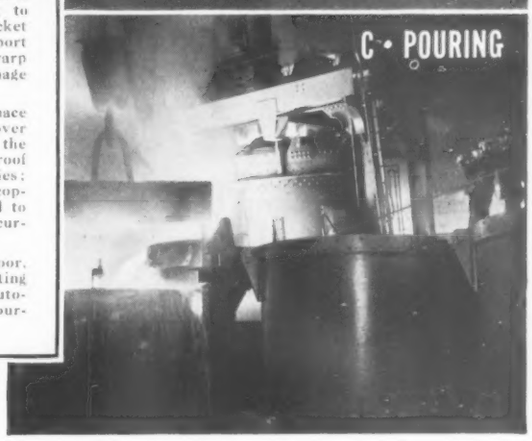


A. Note how gantry-raised roof and electrodes readily roll to a position over the tapping pit to permit speedy drop-bottom bucket charging—how four-point support of the raised roof eliminates warp and consequently reduces damage to refractories.

B. Here is the improved furnace in action with gantry frame over furnace and roof lowered for the heat. Improved welded type roof coolers save roof refractories; water-cooled, current-carrying, copper tubing is uniquely arranged to prevent hysteresis and eddy current losses.

C. As if one unit, furnace, floor, gantry, and roof, still in melting position, tilt together in an automatic, electrically controlled pouring action.





AMERICAN BRIDGE COMPANY

General Offices: Frick Building, Pittsburgh, Pa.

Baltimore · Boston · Chicago · Cincinnati · Cleveland · Denver · Detroit
Duluth · Minneapolis · New York · Philadelphia · St. Louis

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

movable, so that it can be replaced with another of different metal when material requires it. Upper propeller also is removable to adapt unit for use with smaller amounts of material.

Machines Fuse Bodies for Shells

■ Langelier Mfg. Co., Providence, R. I., has designed and built for Frankford arsenal a machine for performing drilling, tapping, counterboring and end milling operations on a body used in connection with a mechanical time fuse for shells.

Machine is constructed with four units, two of which are mounted opposed and carry auxiliary heads. All units are interlocked electrically, making it impossible to index fixtures unless heads are in proper position.

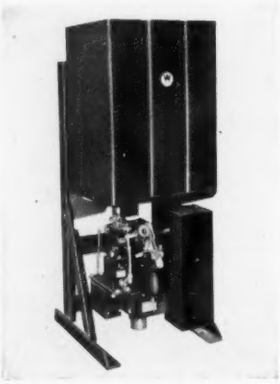
Left hand head has six spindles for drilling, and right hand head has three spindles for counterboring and one for end milling. At rear of machine is a lead-screw-feed tapping unit and a single spindle drilling unit. One operator is required, and production from machine will average 450 complete pieces per hour, with twelve operations performed on each piece.

Breakers Suitable For Mill Motors

■ Westinghouse Electric & Mfg. Co., Pittsburgh, has completed its line of medium capacity indoor circuit breakers by addition of two models rated at 2500 and 5000 volts.

These breakers operate entirely without oil or liquid, function in normal atmosphere and are not dependent upon maintenance of any medium such as air pressure or vacuum. High speed arc control, arc resisting contacts, solenoid operation and improved mechanical construction are some characteristics.

Breakers are adaptable for use in highly repetitive services approaching contactor duty, such as reversing breakers for steel mill motors and primary breakers for arc furnaces on voltages of 6600 and 13,800.



Generator Line Expanded

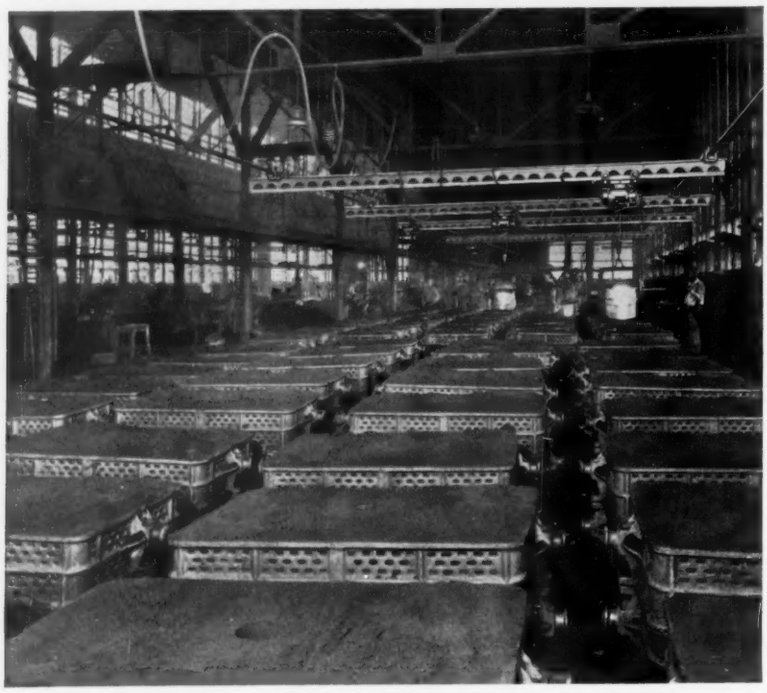
■ Columbia Electric Mfg. Co., 4519 Hamilton avenue, Cleveland, announces their line of alternating current generators has been expanded so as to include sizes ranging from 1½ kilovolt-amperes up to and including 300 kilovolt-amperes in a wide range of speeds, suitable for direct connection to gas, gasoline or diesel engines.

Generators are available with direct connected exciters or for excitation from an external direct current source. With the former type a special compounding type automatic voltage adjuster is available, which will maintain voltage within plus or minus 5 per cent for average load conditions.

Generators are compact, Timken bearing equipped, and are available with complete switchboards.

CLEVELAND TRAMRAIL

MATERIALS HANDLING EQUIPMENT



• This one shop of a large foundry produces two hundred molds per eight hour day. Castings are medium to one hundred and fifty pounds.

• Three 34 foot span Tramrail Cranes and Hand Propelled Carriers with air hoists, operate on a two hundred foot runway.

ALSO BUILDERS OF

CLEVELAND CRANES

FOR EVERY INDUSTRY

CLEVELAND TRAMRAIL

DIVISION OF

THE CLEVELAND CRANE & ENGINEERING CO.

1125 Depot St.

WICKLIFFE, OHIO

Or consult your phone directory under Cleveland Tramrail.

Bus Fabrication

(*Concluded from Page* 83)

finished with spray lacquer coating.

Although the rubber in modern tires is practically immune to temperatures encountered in the baking ovens (175 legrees Fahr.), old tires are used on the coaches during painting and baking operations as well on the road test. As completed coach proceeds from the final assembly line, touchup and lettering of company names is done and new tires applied. Even though the handling operations appear somewhat complicated, in actual operation, the system works out very well, and it is expected the ultimate production rate of four buses per day will be obtained quite easily.

♦

Inspects Pipe Coating Thickness Easily

■ When Harry Hayes of the Los Angeles water department was confronted with inspecting some 13,000 feet of 24 and 36-inch enameled steel pipe to see that thickness of enamel coating was held between the limits of 100 to 150 mills inside and 80 to 120 mills outside, he wanted some way to do the job without limiting areas of inspection or necessity of patching stripped sections.

Accordingly he conceived the idea of adapting to this service an electromagnetic thickness gage recently developed for checking enamel coatings of refrigerator cabinets. Such a thickness gage, adjusted to meet this problem, has been used to measure almost continually the enameled section of pipe as it rotates under the instrument, according to G. F. Maughmer, General Electric Co., Los Angeles. As is shown in the illustration, the operator merely holds the sensitive "head" against the pipe and the instrument in his hand gives a continuous indication of enamel thickness without destroying the film or wasting time. This accurate method has enabled the pipe fabricator to improve his technique and produce a more uniform coating.

Fast, continuous indication of coating thickness is obtained with accuracy within 0.001-inch by use of electromagnetic thickness gage. Photo courtesy General Electric Co., Schenectady, N. Y.

New Type Automobile Filter Conserves Oil

■ A new type oil filter for automobiles, designed to give more miles of operation per quart of lubricant, has been developed by research engineeds of AC Spark Plug division of General Motors, Flint, Mich.

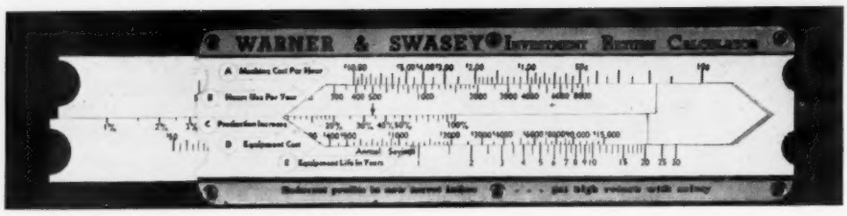
According to C. W. McKinley, chief engineer of the company, this filter not only conserves oil consumption, but cleans and maintains original color of oil and removes dirt and sludge. He reports that filter was tested on new cars of identical make in the $1000 price class. Cars on which filters were installed showed an average of 160 more miles of operation per quart of oil than did cars on which there were no filters. Unit is now being tested by automobile manufacturers.

The A-E-CO LO-HED HOIST
Accessibility of Working Parts Here
Select THE hoist with the greatest accessibility of working parts. Ask the nearest A-E-CO representative* to show you how quickly the working parts can be reached if repairs are required. Ask him to explain Lo-Hed's exclusive features that mean dependable performance and lower maintenance cost. Let him show you Lo-Hed's uses in scores of industries. Find out why Lo-Hed is the logical hoist for EVERY purpose and why it is the only hoist for low headroom conditions. A-E-CO Lo-Hed HOISTS are built in many standard models, from ¼ to 12 ton capacities.
Reduces Handling Delays Here
*Classified phone directories list the local A-E-CO representative in principal cities. Call him in . . . or write us for the new hoist catalog.
Other A-E-CO Products: Taylor Stoker Units • Marine Deck Auxiliaries • Hele-Shaw Fluid Power
A-E-CO Lo-Hed HOIST
AMERICAN ENGINEERING COMPANY
2484 ARAMINGO AVENUE, PHILADELPHIA, PA.

Slide Rule Calculates Profit Possibilities

■ A slide rule, designed to simplify calculation of profit possibilities in equipment purchases, has been developed by Warner & Swasey Co., Cleveland manufacturer of turret lathes, and can be obtained by writing direct to this company.

Whether an investment in new equipment is justified generally depends on such factors as its cost, possibility of increased production, hours of use per year, cost of operation per hour, and machine's useful length of life. Equipped with five scales, three of them movable, slide rule permits rapid calculation of any one of foregoing factors when the others are known or can be approximated. This affords a speedy answer to the knotty problem of balancing potential savings against the original outlay.



Slide rule shows how long it takes for a new machine to pay for itself

Capsule Will Reveal Our Times in 6938

■ Within the next few weeks a "time capsule" constructed of Cupaloy and containing a "cross-section of our times" will be deposited 50 feet beneath the surface on site of the Westinghouse building at the New York World's Fair, with the expectation it will be recovered by archaeologists 5000 years from now.

Consisting principally of copper alloyed with chromium and silver, the capsule is expected to withstand the destructive forces of 50 centuries. It will be 7 feet 2 inches long and 8 inches in diameter. Within this water-tight shell will be a pyrex glass envelope embedded in waterproof mastic. All air will be evacuated and replaced with an inert gas. Thus the contents, consisting principally of small objects and books reproduced in microfilm, will be sealed in a preservative for the enlightenment of future scientists.

The capsule will contain small articles, photographs and written statements descriptive of this age's achievements in science, engineering, social advancement and religious and philosophical thought. Materials placed inside the crypt will be treated to give them resistance to time.

Simultaneously with the deposit of the time capsule, leading libraries, museums and repositories of the world will receive a finely bound and printed book, published on the most permanent paper, telling future archaeologists where the capsule lies, what is in it and how to recover it. It is hoped at least a few copies will survive until the time intended.

Provides Salt Ration

■ Through a new molded plastic dispenser International Salt Co., Scranton, Pa., has provided a convenient way for industrial workers on hot jobs to get their daily ration of salt. Dispenser slips into place in a wall bracket. Its top unscrews for filling and screws tightly shut to protect tablets from any contamination. A label gives directions for taking tablets.

Originally built for hand operation, this unit required 56 man hours for loading, weighing and moving 1500 pound charging buckets into the cupola charger.

As production increased, a bucket had to be in position every 90 seconds. Track was extended to cover additional storage area, and an American MonoTractor was added for propelling the unit along the track.

Now, only 24 man hours are necessary to deliver this greater tonnage, reducing the cost of handling by 58%.

The American MonoTractor offers similar low cost operation of carriers, hoists or cranes on any smooth flange MonoRail system. Write for 24 page book describing the many advantages of this rubber-wheel drive unit.

American MonoRail engineers are available without obligation for consultation on any handling problem.

AMERICAN MONORAIL CO.

13102 Athens Ave., Cleveland, O.

Remote Temperatures

(*Continued from Page* 63)

tube escapes damaging heat and is able to hold accurate calibration and to attain maximum sensitivity. Combined with standard potentiometer control, such equipment not only measures temperature of work in the furnace but it indicates such temperature on a large indicating instrument, draws on a moving chart a detailed temperature record of the work and through suitable auxiliary equipment regulates furnace temperatures accurately and uniformly.

Since it is outside furnace Rayotube element is not subjected to furnace atmospheres and since entire Rayotube can be hermetically sealed, atmospheres outside the furnace likewise have no effect on life, accuracy or sensitivity of the system. Neither is it subjected to battering and vibration of charging and drawing on such applications as in billet heating furnaces.

Applied To Forging

One field where Rayotube temperature measurement is particularly valuable is in forge shops. Being immune to vibration from heavy hammers used in forging, use of these units eliminates thermocouple breakage caused by high temperatures, hammer vibration and rough handling usually accompanying forge shop applications.

Installation of such temperature measuring equipment is quite simple. With the wide-angle type of instrument used in conjunction with open-end target tubes to measure furnace temperature, installation requires only cutting a small hole in the furnace wall and cementing in target tube. A mounting bracket attaches to the outer end of target tube and holds Rayotube rigidly in place.

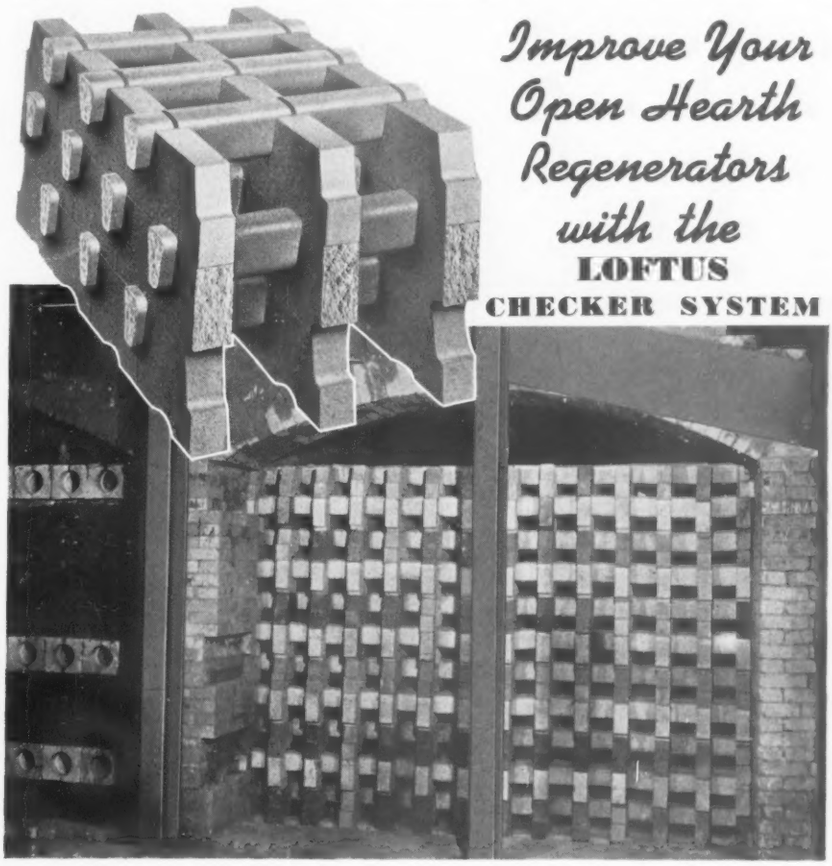
When the narrow angle type is used to measure temperature of work inside furnace, installation is likewise simple. A small hole is cut in furnace wall on a line with the work and Rayotube held by mounting bracket in position to sight through hole onto the work.

This equipment also is widely used in new strip, tube, rod and slab mills where it measures actual temperature of work in various stages of processing. One mill is set up with such a system to produce a continuous record of temperatures of each piece of metal as it proceeds through various slabbing, rolling and forming operations. It would be difficult to imagine how such records could be obtained without this equipment.

There are a number of places in the steel industry in which it is not

Helps Dispose of Scrap

■ **Here scrap from punch presses is delivered to hoppers by belt conveyor. Hoppers dump into traveling bucket conveyors actuating automatic trips. Another set of trips empties buckets into scrap storage bins. Photo courtesy Inland Mfg. Co. division of General Motors Corp. Dayton, Ohio**



Improve Your Open Hearth Regenerators with the
LOFTUS CHECKER SYSTEM

Greater regenerating capacity.
(a) All heating surface directly exposed.
(b) Higher coefficient of heat transfer.

Rigid and strong construction.
(a) Load carried by vertical tile which serve as columns.

Withstands higher temperatures.
(a) No sagging due to cross members carrying no load.

Longer life.
(a) Minimum horizontal surfaces and no pockets to catch dust.

Improved distribution of gases.
(a) Flue openings are uniform due to being spaced laterally and longitudinally.

Savings in fuel.
(a) Due to higher air temperatures and greater heat recovery.

Easier to clean.
(a) Equipped for cleaning without interfering with operation of furnace.

Custom engineered as well as custom built.
(a) Each application analyzed by our engineers and installed under their supervision.

For further particulars communicate with

LOFTUS ENGINEERING CORP.
509 OLIVER BUILDING PITTSBURGH, PA.

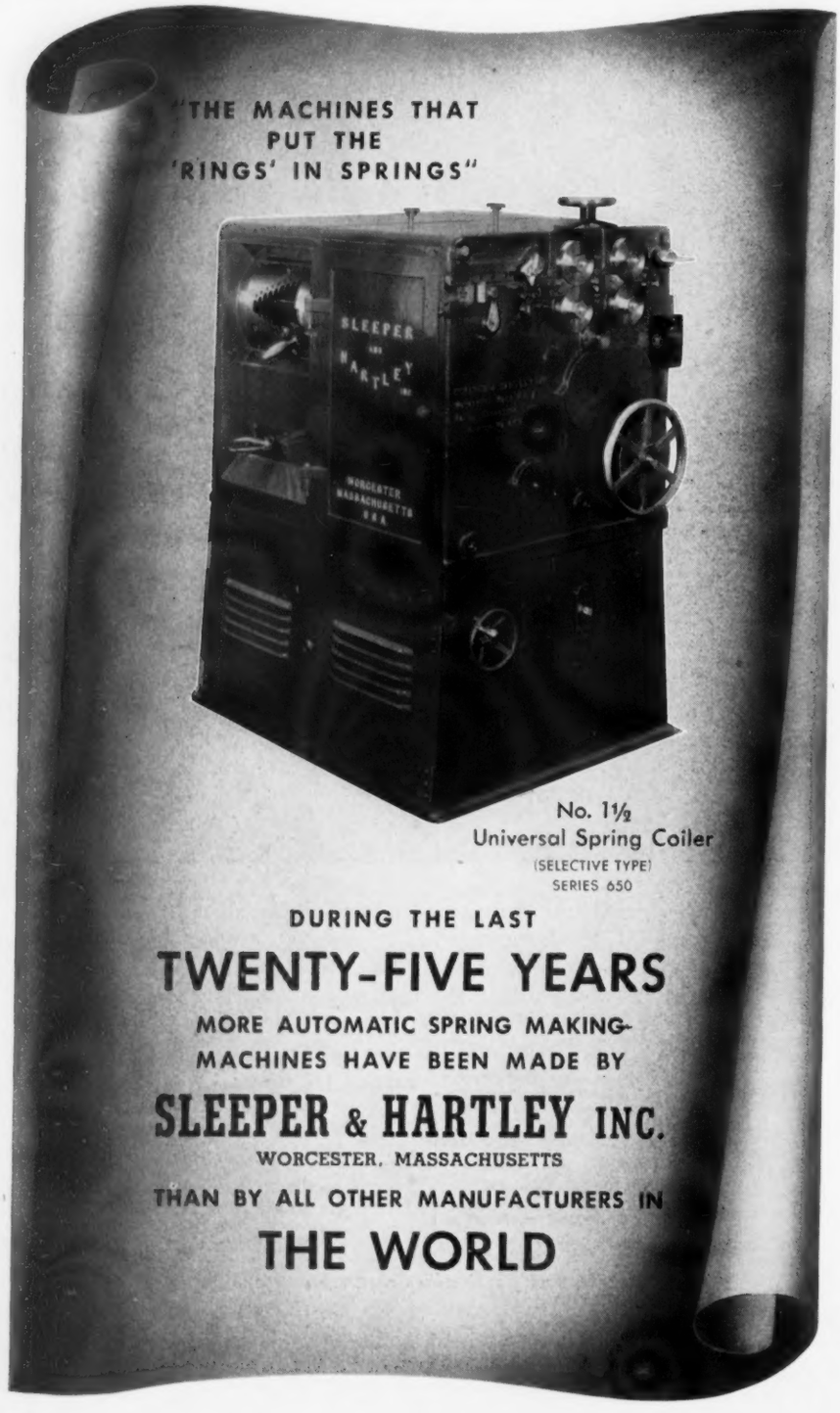
practical to use thermocouples and in which Rayotubes give quite satisfactory service. These include applications where it is necessary to measure and record temperatures of moving objects; where contaminating gases cause thermocouples to lose calibration; where it is necessary to measure temperatures of inaccessible objects inside of furnaces, kilns, etc.; where vibration and rough handling cause excessive thermocouple breakage; where thermocouple maintenance is costly due to extremely high temperature.

Variety of models makes possible choice of exact combination.

Discusses Chromates As Corrosion Inhibitors

■ A general discussion of chromium chemicals as corrosion inhibitors is presented in a pamphlet recently prepared by and available from Mutual Chemical Co. of America, 270 Madison avenue, New York.

In reviewing the use of chromates in combatting corrosion, development of scientific knowledge on this subject is traced from the 18th century. It is shown why and how bichromates protect iron and steel, and to what extent. Applications of corrosion inhibition through bichromates and chromates are described as carried out in several fundamental industries: Refrigeration, air conditioning, the gas, petroleum and chemical industries, transportation, power plants and general plant maintenance.



Press Bends Boiler Plate

■ COMBUSTION Engineering Co., New York, has recently installed in its Hedges-Walsh-Weidner division plant at Chattanooga, Tenn., what is said to be the largest and most powerful press yet constructed for bending boiler plate.

With a clearance between posts of 40 feet 6 inches, the press is capable of cold-bending boiler plate of more than 6 inches in thickness. Press consists of two 3000-ton, 4-post hydraulic presses connected by two built-up beams. Upper beam is 14 feet in depth at the center and has a travel of 5 feet. It contains approximately 1,000,000 pounds of 2-inch plate bolted together.

The two main rams (see STEEL, Aug. 1, page 29) are each 50 inches in diameter and are operated with water pressure of 1500 or 3000 pounds per square inch, according to whether the intensifier is connected to give maximum power. On each side there are four pushback rams arranged for high speed operation and under the bottom die there are four manipulating rams for handling the work. The equipment extends 27 feet from floor to top of cylinders.

Press is served by a 30-ton special double trolley crane and a plate heating furnace capable of taking plates 14 feet wide and 45 feet long. Equipment is housed in a new building 80 x 323 feet.

While the press will bend plates more than 6 inches thick, the maximum so far has been around 5¼ inches. A decided tendency is noted toward the use of extremely high-pressure boilers in both central station and industrial plant.

Hose Resists Solvents

■ A lacquer spray and solvent hose with a lining of synthetic rubber has been introduced by United States Rubber Products Inc., 1790 Broadway, New York.

Lacquer and synthetic enamel sprays usually contain butyl acetate and other solvents which are destructive to natural rubber. This new hose has been designed to resist such chemical action, as well as the action of oils. Very little swelling occurs due to action of solvents. Hose will not discolor delicate shades of paint, it is said.

DELIVERY OF QUALITY OILS IS

Only One Step In This Service!

Socony-Vacuum

Correct Lubrication

Puts Socony-Vacuum's Great Engineering Service at your service...gives your men the help of specialists...

BACKED BY 72 YEARS OF LUBRICATION EXPERIENCE

GARGOYLE Lubricants

BUY "CORRECT LUBRICATION" instead of just oil, and you'll get more for your money. *Smoother, more uniform production! Greater machine economy!*

Here's the reason...

Socony-Vacuum Correct Lubrication puts a trained engineer—backed by the greatest experience in the oil industry—at your service! His specialized knowledge will help your men make sure every machine gets *the right oil in the right place the right way!*

Socony-Vacuum Correct Lubrication is saving money in 110 industries. Why not see what it can do for you?

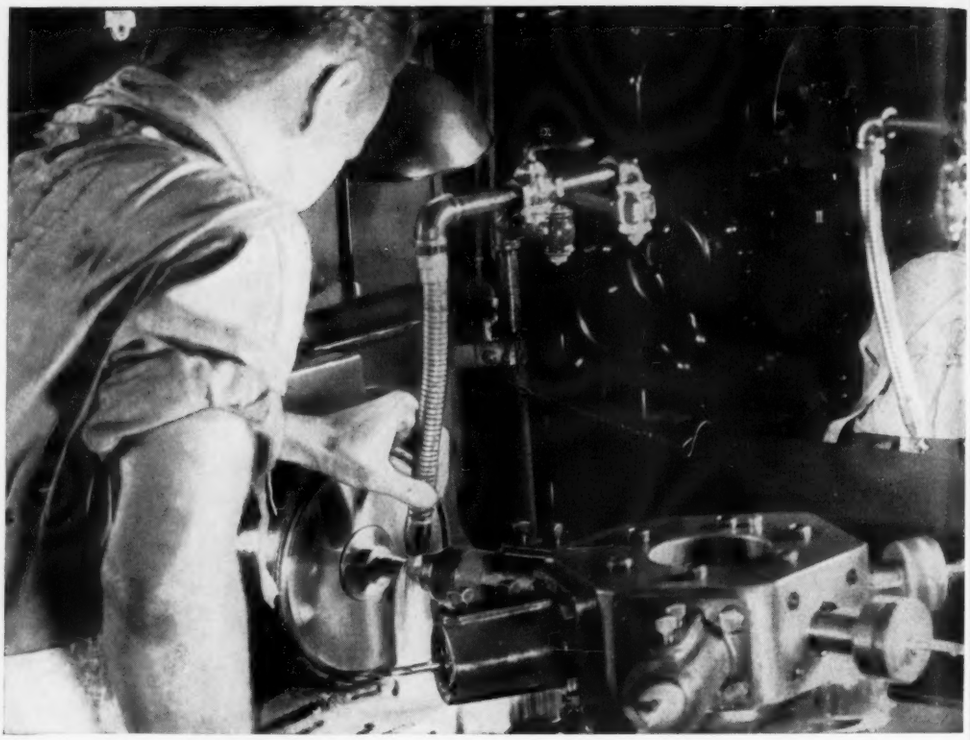
SEE NEXT PAGE

SOCONY-VACUUM OIL CO., Inc.

STANDARD OIL OF NEW YORK DIVISION · WHITE STAR DIVISION · LUBRITE DIVISION · MAGNOLIA PETROLEUM COMPANY
CHICAGO DIVISION · WHITE EAGLE DIVISION · WADHAMS OIL COMPANY · GENERAL PETROLEUM CORPORATION OF CALIFORNIA

HOW TO SAVE GRINDS AND BOOST CUTTING HOURS

Socony-Vacuum's Cutting and Soluble Oils will help to improve both the quantity and quality of work done. They will give much longer tool life and lower unit production costs



FOR HIGH-SPEED automatics or precision work, Socony-Vacuum's Cutting Oils are most economical. They have the high, extreme-pressure properties required for machining hardened alloy steel. They are made lighter for machining of fast-cutting screw stocks, low carbon steels.

You can see the savings on your balance sheets. These Socony-Vacuum Oils cut dollars off the "cost" side...add them to your profits!

Especially for Today's Needs

Socony-Vacuum's Cutting Oils have been adjusted to meet the cutting pressures and rubbing speeds encountered today. This extreme pressure value minimizes frictional heat and the wear of cutting tools. Their exceptional lubricity aids in securing a high quality of finish. Even in shops where further savings were thought impossible, the use of Socony-Vacuum Cutting Oils has resulted in surprising economies.

Determining Absolute Machinability

Socony-Vacuum has developed a scientific guide to the selection of correct cutting and soluble oils for every metal cutting operation. It gives a uniform basis for comparing the relative machinability of all classes of metals. It helps to determine accurately the machinability of any new metal before putting it in a machine. Ask the Socony-Vacuum Representative to show you this Machinability Index when he calls.

Scientific Helps for Machine Tool Men

Socony-Vacuum offers you, without cost, valuable aids to efficient, economical operation. The picture below shows some of them. They are yours for the asking. Just address the nearest Socony-Vacuum office.

He is a Good Man to Know

The Socony-Vacuum Representative calling at your shop can help you in many ways. One of the best methods for using the vast experience of this organization on your individual problems is to let him work with your men. You will quickly see results that mean additional profits from every operation.

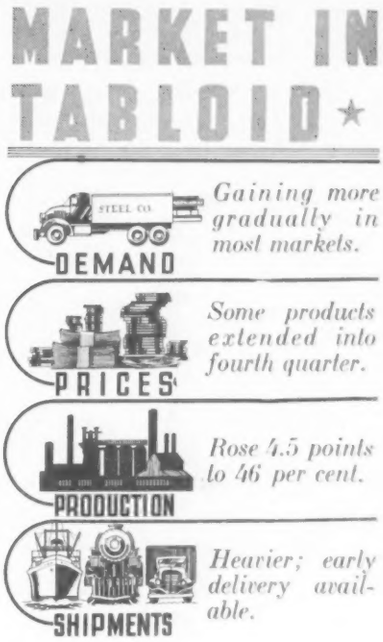
SOCONY-VACUUM OIL CO., INC.

STANDARD OIL OF NEW YORK DIVISION · WHITE STAR DIVISION · LUBRITE DIVISION · MAGNOLIA PETROLEUM COMPANY
CHICAGO DIVISION · WHITE EAGLE DIVISION · WADHAMS OIL COMPANY · GENERAL PETROLEUM CORPORATION OF CALIFORNIA

GARGOYLE Lubricants

Steel Markets Show Signs of Hesitation

War Threat Blamed; Output Rises To Year's Peak



■ DESPITE some hesitancy in steel demand, business in most products is steady or heavier, and production has reached 46 per cent, a new high for the year.

A slower rate of improvement in steel output is seen for the coming quarter. Developments the past 90 days have brought operations fairly close in line with actual consumption, in contrast to the excess of the latter during earlier months. Subsequent gains, consequently, will be dictated largely by activities in various steel consuming industries.

Sentiment has been harmed by the unsettled European situation, but as yet only small direct reflection of the war scare is apparent in domestic steel markets. For some time consumers have been cautious in their purchases, thereby providing but slight opportunity to restrict buying further in order to align it with early needs. Nevertheless, the possibility of actual hositilities abroad is given a share of the responsibility for the tendency for steel demand to level off lately.

Slowness with which automotive steel shipments are increasing partially is offset by sustained demand from miscellaneous consumers, together with a slight gain in railroad requirements and expanding activity in building and engineering construction. A number of railroad shops are reopening for routine repairs to equipment, the program of the New York Central being outstanding in this respect. While freight car purchases in September give promise of being the second or third largest for the year to date, the carriers show little interest in major equipment buying programs. Purchases of track material are equally scant.

Track bolts have been reduced $4 a ton, this commodity not having been affected by the last general reduction. Ferroalloy prices generally have been reaffirmed for fourth quarter, and pig iron business is being taken for delivery next period at unchanged quotations. In some instances steel products have been booked on a similar basis prior to official announcement of prices, expected this week.

Efforts of the automotive industry to expand assemblies were stymied partially last week by the first strike of the 1939 model season. Resultant shortage of bodies for one interest and the further curtailment in Ford's operations in preparation for its start on new model production reduced output for the industry from 17,485 units to 16,100. General Motors turned out 4675 units, against 2625 the week before; Chrysler dropped from 6000 to 5950; Ford slumped from 5000 to 515; while all other makers produced 4960, compared with 3860 the previous week.

Structural shape awards last week were the largest in more than a year, aided by the placing of 50,000 tons for the Metropolitan Life Insurance Co. housing project, Bronx, N. Y., with Bethlehem Steel Co.

Several other orders enliven construction markets. Outstanding are 7000 tons of structural shapes for an elevated highway and approaches, Queens, New York; 5000 tons of reinforcing bars for the Red Hook housing project, Brooklyn; and 3000 tons of piling for a lake pier and jetties, Chicago. Prospective business in line pipe includes 80 miles of 8 and 10-inch pipe for a line in southern Illinois and a proposed line to be laid between southwestern Kansas and the Mesaba iron range in Minnesota.

Last week's 4.5-point rise in steelmaking largely was the aftermath of the Labor day interruption the preceding week. At 46 per cent, operations were 1.5 points ahead of the pre-holiday period, however. Pittsburgh, at 36 per cent, was up 4 points, while Chicago gained 3.5 points to 41.5 per cent and eastern Pennsylvania increased 2 points to 33 per cent. Other districts to increase output included Wheeling, up 7 points to 56 per cent; Birmingham, up 1 point to 57 per cent; Cincinnati, up 5 points to 65 per cent; and Cleveland, up 5 points to 48.5 per cent. Five centers were unchanged: Buffalo at 49, New England at 60, St. Louis at 42, Detroit at 67 and Youngstown at 46.

Scrap markets are dull, except for export business. In addition to the recent purchase of 80,000 tons by Italy, an order for 50,000 tons for Germany is reported. The scrap composite was unchanged last week at $14.25. The iron and steel composite held at $36.50, while the finished steel composite was steady at $57.20.

COMPOSITE MARKET AVERAGES

	Sept. 17	Sept. 10	Sept. 3	One Month Ago Aug., 1938	Three Months Ago June, 1938	One Year Ago Sept., 1937	Five Years Ago Sept., 1933
Iron and Steel	$36.50	$36.50	$36.50	$36.50	$38.41	$40.16	$30.36
Finished Steel	57.20	57.20	57.20	57.20	61.55	61.70	48.52
Steelworks Scrap..	14.25	14.25	14.29	14.44	10.89	18.99	10.83

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Sept. 17, 1938	Aug. 1938	June 1938	Sept. 1937
Steel bars, Pittsburgh	2.25c	2.25c	2.45c	2.45c
Steel bars, Chicago	2.25	2.25	2.40	2.50
Steel bars, Philadelphia	2.57	2.57	2.47	2.74
Iron bars, Terre Haute, Ind.	2.15	2.15	2.35	2.35
Shapes, Pittsburgh	2.10	2.10	2.25	2.25
Shapes, Philadelphia	2.215	2.215	2.405	2.455
Shapes, Chicago	2.10	2.10	2.25	2.30
Plates, Pittsburgh	2.10	2.10	2.25	2.25
Plates, Philadelphia	2.15	2.15	2.38	2.435
Plates Chicago	2.10	2.10	2.25	2.30
Sheets, hot-rolled, Pittsburgh	2.15	2.15	2.40	2.40
Sheets, cold-rolled, Pittsburgh	3.20	3.20	3.45	3.55
Sheets, No. 24, galv., Pittsburgh	3.50	3.50	3.75	3.80
Sheets, hot-rolled, Gary	2.15	2.15	2.40	2.50
Sheets, cold-rolled, Gary	3.20	3.20	3.20	3.65
Sheets, No. 24, galv., Gary	3.50	3.50	3.80	3.90
Bright bess., basic wire, Pitts.	2.60	2.60	2.90	2.90
Tin plate, per base box, Pitts.	$5.35	$5.35	$5.35	$5.35
Wire nails, Pittsburgh	2.45	2.45	2.75	2.75

Semifinished Material

Sheet bars, open-hearth, Youngs.	$34.00	$34.00	$37.00	$37.00
Sheet bars, open-hearth, Pitts.	34.00	34.00	37.00	37.00
Rerolling billets, Pittsburgh	34.00	34.00	37.00	37.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	43.00	43.00	47.00	47.00

Pig Iron

	Sept. 17, 1938	Aug. 1938	June 1938	Sept. 1937
Bessemer, del. Pittsburgh	$21.34	$21.34	$25.34	$25.26
Basic, Valley	19.50	19.50	23.50	23.50
Basic, eastern, del. Philadelphia.	21.34	21.34	21.34	25.26
No. 2 foundry, Pittsburgh	21.21	21.21	25.21	25.21
No. 2 foundry, Chicago	20.00	20.00	24.00	24.00
Southern No. 2, Birmingham	16.38	16.38	20.38	20.38
Southern No. 2, del. Cincinnati	19.89	19.89	23.89	23.69
No. 2X, Del. Phila. (differ. av.)	22.215	22.215	22.215	26.135
Malleable, Valley	20.00	20.00	24.00	24.00
Malleable, Chicago	20.00	20.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	28.34	28.34	30.34	30.04
Gray forge, del. Pittsburgh	20.17	20.17	24.17	24.17
Ferromanganese, del. Pittsburgh	97.77	97.77	107.77	107.29

Scrap

Heavy melting steel, Pittsburgh.	$15.25	$15.20	$11.40	$20.40
Heavy melt. steel, No. 2, E. Pa.	12.75	13.00	9.875	16.69
Heavy melting steel, Chicago	13.75	14.00	10.25	17.85
Rails for rolling, Chicago	17.75	18.25	14.90	20.35
Railroad steel specialties, Chicago	16.75	16.75	13.50	20.50

Coke

Connellsville, furnace, ovens	$ 3.75	$3.75	$3.90	$4.45
Connellsville, foundry, ovens	5.00	5.00	5.05	5.25
Chicago, by-product fdry., del.	10.50	10.50	11.00	11.00

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh, Gary	2.15c
Chicago, delivered	2.18c
Cleveland	2.15c
Detroit, del.	2.25c
Buffalo	2.15c
Sparrows Point, Md.	2.15c
New York, del.	2.39c
Philadelphia, del.	2.32c
Granite City, Ill.	2.25c
Middletown	2.15c
Youngstown	2.15c
Birmingham	2.15c
Pacific Coast points	2.65c

Cold Rolled

Pittsburgh, Gary	3.20c
Chicago, delivered	3.23c
Buffalo	3.20c
Cleveland	3.20c
Detroit, delivered	3.30c
Philadelphia, del.	3.52c
New York, del.	3.54c
Granite City, Ill.	3.30c
Middletown	3.20c
Youngstown	3.20c
Pacific Coast points	3.80c

Galvanized No. 24

Pittsburgh, Gary	3.50c
Chicago, delivered	3.53c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown	3.50c
Youngstown	3.50c
Pacific Coast points	4.00c

Tin Mill Black No. 29

Pittsburgh	3.15c
Gary	3.15c
Granite City, Ill.	3.25c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.95c
Pacific Coast	4.65c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.42c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, base	2.10c
Sparrows Point, base	2.10c
Claymont, Del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c
Pittsburgh	3.35c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast points	2.70c

Tin and Terne Plate

Tin plate, coke (base box) Pittsburgh, Gary	$5.35
Granite City	5.45
Mfg. terne plate, Pittsburgh, Gary	4.65c
Granite City	4.75c

Bars

Soft Steel

(Base, 3 to 25 tons)

Pittsburgh	2.25c
Chicago or Gary	2.25c
Duluth	2.35c
Birmingham	2.25c
Cleveland	2.25c
Buffalo	2.25c
Detroit, delivered	2.35c
Philadelphia, del.	2.57c
Boston, delivered	2.62c
New York, del.	2.59c
Gulf ports	2.60c
Pacific Coast points	2.85c

Rail Steel

To Manufacturing Trade

Pittsburgh	2.10c
Chicago or Gary	2.10c
Detroit, delivered	2.20c
Cleveland	2.10c

Buffalo	2.10c
Birmingham	2.10c
Gulf ports	2.45c
Pacific coast points	2.70c

Iron

Terre Haute, Ind.	2.15c
Chicago	2.15c
Philadelphia	2.47c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Pittsburgh	2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt.	2.05c
Detroit, delivered	2.75c
Gulf ports	2.40c
Pacific coast ports, f.o.b. car docks	2.50c
Philadelphia, del.	2.22c

Rail steel, straight lengths, quoted by distributors

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birmingham	1.90c
Detroit, delivered	2.00c
Gulf ports	2.25c
Pacific Coast	2.35c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard wire nails	$2.45
Cement coated nails	$2.45

(Per pound)

Polished staples	3.15c
Galv. fence staples	3.40c
Barbed wire, galv.	3.20c
Annealed fence wire	2.95c
Galv. fence wire	3.35c
Woven wire fencing (base C. L. column)	67.00
Single loop bale ties, (base C. L. column)	56.00

To Manufacturing Trade

Base, Pitts.-Cleve.-Chicago-Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.65c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut nails, C. L. Pitts. (10% disc. on all extras)	$3.60

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.70c	3.40c
Chicago	2.70c	3.40c
Gary, Ind.	2.70c	3.40c
Detroit	2.75c	*3.50c
Cleveland	2.70c	3.40c
Buffalo	2.70c	3.40c

*Delivered.

Alloy Bars (Hot)

(*Base, 3 to 25 tons*)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.80c
Detroit, delivered	2.90c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo.	0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni.	1.10
5100 0.80-1.10 Cr.	0.45
5100 Cr. spring flats	0.15
6100 bars	1.20
6100 spring flats	0.85
Cr. N., Van.	1.50
Carbon Van.	0.85
9200 spring flats	0.15
9200 spring rounds, squares	0.40

Electric furnace up 50 cents.

Piling

Pittsburgh	2.40c
Chicago, Buffalo	2.40c
Gulf ports	2.75c

Strip and Hoops

(Base, hot-rolled, 1 to 25 tons; cold-rolled, 3 to 25 tons)

Hot strip to 23⅞-in. Pittsburgh, Chicago, Gary, Cleveland Youngstown, Middletown Birmingham	2.15c
Detroit, del.	2.25c
Philadelphia, del.	2.47c
New York, del.	2.51c
Cooperage hoop, Pittsburgh, Chicago	2.25c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.15c

Carbon	Cleve. Pitts.
0.26—0.50	2.95c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass., $4 higher.

Commodity Cold-Rolled Strip	
Pitts.-Cleve.-Youngstown	3.10c
Detroit, del.	3.20c
Worcester, Mass.	3.50c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$42.50
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00
Angle bars, billet, mills	2.80c
Do., axle steel	2.35c
Spikes, R. R. base	4.15c
Track bolts, base	4.35c
Car axles forged, Pitts., Chgo., B'ham.	3.15c
Tie plates, base	$46.00

Base, light rails 25 to 60 lbs.; 20 lbs. up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists, carloads 5% up; full containers additional 10%.

Carriage and Machine

½ x 6 and smaller	65-5-5 off
Do. larger, to 1-in.	60-10-5 off
Do. 1⅛ and larger	60-5-5 off
Tire bolts	50-5 off

Stove Bolts

In packages with nuts attached 70-5 off; in packages with nuts separate 70-10-5 off; in bulk 80-5 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	50-10-5-5 off
Elevator bolts	50-10-5-5 off

Plow Bolts

All sizes	65-5-5 off

Nuts

Semifinished hex.; ⅛-in. and smaller	60-10-5 off
Do., ⅛ to 1-inch	60-5-5 off
Do., over 1-inch	60-5 off

Hexagon Cap Screws

Milled	50-10-5 off
Upset, 1-in. smaller	67½-10 off

Square Head Set Screws

Upset, 1-in., smaller	75-10 off
Headless set screws	70-10 off

Rivets, Washers

Structural, Pittsburgh, Cleveland	3.40c
Structural, Chicago	3.40c
⅞-inch and smaller, Pitts., Chi., Cleve.	65-10 off
Wrought washers, Pitts., Chi., Phila. to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l.	$5.75 off
Do., less carloads, 5 kegs or more, no discount on any extras	$3.90
Do., under 5 kegs no disc. on any extras	$4.05

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2½ less. Wrought pipe, Pittsburgh.

Butt Weld

Steel

In.	Blk.	Galv.
⅛	63½	54
¼	66½	58
1—3	68½	60½

Iron

¼	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½	
2, lap weld	60	
2½ to 3, lap weld	63	
3½ to 6, lap weld	65	
7 and 8, lap weld	64	
10-inch lap weld	63½	
12-inch, lap weld	62½	

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet, f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O. D.	13	$ 9.72	$23.71
1¾" O. D.	13	11.06	22.93
2" O. D.	13	12.38	19.35
2¼" O. D.	13	13.79	21.68
2¼" O. D.	12	15.16	.....
2½" O. D.	12	16.58	26.57
2¾" O. D.	12	17.54	29.00
3" O. D.	12	18.35	31.36
3½" O. D.	11	23.15	39.81
4" O. D.	10	28.66	49.90
5" O. D.	9	44.25	73.93
6" O. D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O. D.	13	$ 7.82	$ 9.01
1¼" O. D.	13	9.26	10.67
1½" O. D.	13	10.23	11.79
1¾" O. D.	13	11.64	13.42
2" O. D.	13	13.04	15.03
2¼" O. D.	13	14.54	16.76
2¼" O. D.	12	16.01	18.45
2½" O. D.	12	17.54	20.21
2¾" O. D.	12	18.59	21.42
3" O. D.	12	19.50	22.48
3½" O. D.	11	24.62	28.37
4" O. D.	10	30.54	35.20
4½" O. D.	10	37.35	43.04
5" O. D.	9	46.87	54.01
6" O. D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$42.00-43.00
4-in., Birmingham	45.00-46.00
4-in., Chicago	53.80-54.80
6-in. & over, Chicago	50.80-51.80
6-in. & over, east fdy.	46.00
Do., 4-in.	49.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

6 x 6 to 9 x 9-in., base

Pitts., Chicago, Buffalo	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅝-inch incl.	43.00
Do., over ⅝ to ⅞-in. incl.	48.00

Worcester up $2; Galveston up $6; Pacific Coast up $9.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.75
Connellsville, fdry.	4.75- 5.50
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.50- 5.75
Wise county fur.	4.50- 4.75

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	9.75
Chicago, del.	10.50
Milwaukee, ovens	10.50
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.00
Indianapolis, del.	10.00
Cincinnati, del.	9.75
Cleveland, del.	10.30
Buffalo, del.	10.50
Detroit, del.	10.25
Philadelphia, del.	10.65

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	22.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
Do. (450 lbs.)	15.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	5.75c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$27.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$21.00	$21.50	$20.50	$22.00
Birdsboro, Pa.	21.00	21.50	20.50	22.00
Birmingham, Ala.‡	16.38	.....	15.38	21.00
Buffalo	20.00	20.50	19.00	21.00
Chicago	20.00	20.00	19.50	20.50
Cleveland	20.00	20.00	19.50	20.50
Detroit	20.00	20.00	19.50	20.50
Duluth	20.50	20.50	.....	21.00
Erie, Pa.	20.00	20.50	19.50	21.00
Everett, Mass.	21.75	22.25	21.25	22.75
Granite City, Ill.	20.00	20.00	19.50	20.50
Hamilton, O.	20.00	20.00	19.50	.....
Neville Island, Pa.	20.00	20.00	19.50	20.50
Provo, Utah	18.00	.....	.....	.....
Sharpsville, Pa.	20.00	20.00	19.50	20.50
Sparrow's Point, Md.	21.00	.....	20.50	.....
Swedeland, Pa.	21.00	21.50	20.50	22.00
Toledo, O.	20.00	20.00	19.50	20.50
Youngstown, O.	20.00	20.00	19.50	20.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	21.39	21.39	20.89	21.89
Baltimore from Birmingham	21.78	.....	20.66	.....
Boston from Birmingham	21.87	.....	.....	.....
Boston from Everett, Mass.	22.25	22.75	21.75	23.25
Boston from Buffalo	22.25	22.75	21.75	23.25
Brooklyn, N. Y., from Bethlehem	23.50	24.00	.....	.....
Canton, O., from Cleveland	21.39	21.39	20.89	21.89
Chicago from Birmingham	†20.22	.....	.....	.....
Cincinnati from Hamilton, O.	20.44	21.11	20.61	.....
Cincinnati from Birmingham	20.06	.....	19.06	.....
Cleveland from Birmingham	20.32	.....	19.82	.....
Mansfield, O., from Toledo, O.	21.94	21.94	21.44	21.44
Milwaukee from Chicago	21.10	21.10	20.60	21.60
Muskegon, Mich., from Chicago, Toledo or Detroit	23.19	23.19	22.69	23.69
Newark, N. J., from Birmingham	22.15	.....	.....	.....
Newark, N. J., from Bethlehem	22.53	23.03	.....	.....
Philadelphia from Birmingham	21.46	.....	20.96	.....
Philadelphia from Swedeland, Pa.	21.84	22.34	21.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	22.45	22.45	21.95	21.95

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	20.50	20.50	20.00	.....
St. Louis from Birmingham	†20.12	...	19.72	.....
St. Paul from Duluth	22.63	22.63	.....	23.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $25.50, Phil. base, standard and copper bearing, $26.63.

Gray Forge		Charcoal	
Valley furnace	$19.50	Lake Superior fur.	$25.00
Pitts. dist. fur.	19.50	do., del. Chicago	28.34
		Lyles, Tenn	23.50

Silvery†

Jackson county, O., base: 6-6.50 per cent $24.50; 6.51-7—$25.00; 7-7.50—$25.50; 7.51-8—$26.00; 8-8.50—$26.50; 8.51-9—$27.00; 9-9.50—$27.50; Buffalo $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	56.05
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickset magnesite grains, f.o.b. Chewelah, Wash., net ton, bulk	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$23.50-24.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail $20, barge	$22.00
No. 2 lump	22.00-23.00

Ferroalloy Prices

Ferromanganese, 78-82%, tidewater, duty pd. $92.50
Do., del. Pittsburgh 97.77

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 28.00
Do., New Orleans 28.00
Do., 26-28%, Palmerton 33.00

Ferrosilicon, 50% freight allowed, c.l. 69.50
Do., ton lot 80.50
Do., 75 per cent 126.00
Spot, $5 a ton higher.

Silicoman., 2½ carbon 97.75
2% carbon 102.75 1% 112.75
Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.60-1.65

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80

Ferrophosphorus, per ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del. carlots 10.50c
Do., ton lots 11.25c
Do., less-ton lots 11.50c

67-72% carloads, 2% carbon, per lb. contained chrome 16.50c
Do., ton lots 17.25c
Do., less-ton lots 17.50c

	Carloads	Ton lots	Less ton
2% carb.	16.50c	17.25c	17.50c
1% carb.	17.50c	18.25c	18.50c
0.10% carb.	18.50c	19.25c	19.50c
0.20% carb.	19.50c	20.25c	20.50c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40%, lb. con. ti., ton lots $1.23
Do, less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do, less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-55%, contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do, less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50
Do, spot 145.00
Do, contract, ton lots 145.00
Do, spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do, spot 160.00
Do, contract, ton lots 160.00
Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract carloads, freight allowed, lb. 7.25c
Do, spot carlots, bulk 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.05
Do, smaller lots 2.15

Vanadium Pentoxide, contract, lb. contained 1.10
Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c
Do, spot 85.00c
88% chrome, contract 79.00c
Do, spot 84.00c

Silicon Metal, 1% iron, contract, lb. 14.50c
Do, 2% 13.00c
Spot ¼c higher

Silicon Briquets, contract, carloads, freight allowed, ton $69.50
Carload, spot 74.50
Less-ton lots, lb. 3.75c

Manganese Briquets, contract carloads, freight allowed lb. 4.75c
Ton lots 5.25c
Less-ton lots 5.50c
Spot ¼c higher

Zirconium Alloy, 12-15%, carloads, gross ton $97.50
Do, spot 102.50
34-40%, contract, carloads, lb., alloy 14.00c
Do, ton lots 15.00c
Do, less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa., 200-lb. kegs, lb. $2.60
Do, 100-200 lb. lots 2.75
Do, under 100-lb. lots 3.00

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets Hot Rolled	Sheets Cold Rolled	Sheets Galv. No. 24
Boston	3.98	4.21	5.21	3.85	3.85	5.66	3.86	4.93	4.76
New York (Metropolitan)	3.94	4.11	4.11	3.76	3.75	5.56	3.73	4.90	4.40
Philadelphia	3.60	3.60	4.10	3.40	3.40	5.00	3.40	....	4.50
Baltimore	3.80	3.95	4.35	3.65	3.65	5.00	3.70	5.05	4.30
Norfolk, Va.	4.00	4.15	4.55	3.85	3.85	5.20	3.90	4.80	5.40
Buffalo	3.60	3.97	3.97	3.77	3.55	5.40	3.50	4.55	4.40
Pittsburgh	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.60	4.50
Cleveland	3.50	3.65	3.65	3.55	3.73	5.33	3.50	4.70	4.68
Detroit	3.68	3.83	3.83	3.75	3.80	5.42	3.58	4.65	4.74
Cincinnati	3.85	3.82	3.82	3.80	3.83	5.43	3.57	....	4.57
Chicago	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.45	4.50
Minneapolis	3.85	4.00	4.00	3.80	3.80	5.40	3.75	5.10	4.75
Milwaukee	3.73	3.88	3.88	3.68	3.68	5.28	3.63	4.58	4.63
St. Louis	3.87	4.02	4.02	3.82	3.82	5.42	3.77	4.72	4.77
Kansas City	4.15	4.30	4.30	4.10	4.10	5.70	4.10	....	4.75
Memphis	4.01	4.16	4.16	3.96	3.96	5.71	3.91	....	5.26
Chattanooga	3.90	4.05	4.05	3.85	3.85	5.80	3.80	....	4.40
Tulsa, Okla.	4.64	4.79	4.79	4.59	4.59	6.19	4.54	....	5.54
Birmingham, Ala.	3.50	3.65	3.65	3.45	3.45	5.83	3.40	....	4.75
New Orleans	4.10	4.65	4.65	4.00	4.00	5.95	4.25	....	5.15
Houston, Tex.	3.50	5.85	6.25	4.05	4.05	5.65	4.20	....	5.25
Seattle	4.30	4.50	5.85	4.05	4.15	5.90	4.20	....	5.50
Portland, Oreg.	4.30	4.70	6.10	4.15	4.15	5.90	3.75	6.50	4.75
Los Angeles	4.00	4.50	6.35	4.00	4.00	6.20	4.20	6.30	5.05
San Francisco	4.05	4.45	6.00	3.85	3.95	5.45	4.00	6.40	5.15

	Cold Rolled Strip	Cold Finished Bars	SAE Hot-rolled Bars (Unannealed) 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series	SAE Cold Drawn Bars 2300	SAE Cold Drawn Bars 3100
Boston	3.61	4.43	4.28	7.65	6.25	6.00	8.05	8.73	7.33
New York	3.66	4.39	4.14	7.50	6.10	5.85	....	8.69	7.29
Philadelphia	3.66	4.36	3.85	7.46	6.06	5.81	8.71	....	....
Baltimore	....	4.35	3.95	.	.	.	....	....	....
Norfolk, Va.	....	4.60	....	....	....	....	....	....	....
Buffalo	3.57	4.05	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Pittsburgh	3.35	3.95	3.80	7.35	5.95	5.70	7.75	8.35	6.95
Cleveland	3.35	4.05	3.70	7.45	6.05	6.05	7.85	8.25	6.85
Detroit	3.55	4.10	3.83	7.57	6.17	5.92	7.39	8.55	7.15
Cincinnati	3.60	4.30	3.90	7.59	6.19	5.94	8.99	8.60	7.20
Chicago	3.65	4.05	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Minneapolis	....	4.64	4.00	7.60	6.20	8.79	9.34	8.94	7.54
Milwaukee	....	4.18	3.93	7.48	6.08	5.83	7.88	8.48	7.08
St. Louis	3.76	4.32	4.07	7.62	6.22	5.97	8.02	8.62	7.22
Kansas City	4.46	4.60	....	....	....	....	....	....	....
Memphis	....	4.61	....	....	....	....	....	....	....
Chattanooga	....	4.90	.	.	.	.	....	....	....
Tulsa, Okla.	....	5.09	....	....	.	.	....	....	....
Birmingham, Ala.	....	4.73	....	....	....	....	....	....	....
New Orleans	5.00	5.10	....	.	.	.	....	....	....
Seattle	....	5.60	5.65	....	7.80	7.65	8.45	....	....
Portland, Oreg.	....	5.60	6.10	9.00	8.00	7.85	8.70	....	
Los Angeles	4.45	6.60	4.65	9.40	8.55	8.40	9.05	10.40	9.55
San Francisco	*9.30	6.55	5.20	9.65	8.80	8.65	9.30	10.65	9.80

*Based on minimum quantity

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, Sept. 15

Export Prices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, gross tons Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$26.45 5 10 0	$15.19	1 17 0
Basic bessemer	....	18.41	2 4 6
Hematite, Phos. .03-.05	31.26 6 10 0*	.....	.....
Billets	$37.27 7 17 6	$35.17	4 5 0
Wire rods, No. 5 gage	54.23 11 5 6	42.41	5 2 6
Standard rails	$48.70 10 2 6	$47.80	5 15 0
Merchant bars	52.91 11 0 0	1.92c to 1.97c	5 2 6 to 5 5 0
Structural shapes	2.27c 10 12 6	1.83c	4 17 6
Plates, †¼ in. or 5 mm.	3.34c 11 11 3	1.92c to 2.29c	5 12 6 to 6 2 6
Sheets, black, 24 gage or 0.5 mm.	2.78c 13 0 0	2.72c	7 5 0
Sheets, gal., 24 ga., corr.	3.58c 16 15 0	3.28c	8 15 0
Bands and strips	2.83c 13 5 0	2.15c	5 15 0
Plain wire, base	4.17c 19 10 0	2.29c to 2.72c	6 2 6 to 7 5 0
Galvanized wire, base	4.97c 23 5 0	2.95c to 3.04c	1 17 6 to 8 2 6
Wire nails, base	3.95c 18 10 0	2.61c to 2.80c	7 0 0 to 7 10 0
Tin plate, box 108 lbs.	$ 5.08 1 0 3	.....	.....

British ferromanganese $92.50 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d	French Francs		Belgian Francs		Reich Mark
Fdy. pig iron, Si. 2.5	$26.21 5 9 0(a)	$16.27	598	$14.83	440	$25.24 63
Basic bess. pig iron	24.05 5 0 0(a)	.....	...	.....	...	27.84 (b) 69.50
Furnace coke	6.49 1 7 6	5.58	205	7.25	215	7.61 19
Billets	37.75 7 17 6	22.85	840	28.98	860	38.67 96.50
Standard rails	2.16c 10 2 6	1.38c	1,150	2.06c	1,375	2.38c 132
Merchant bars	2.61c 12 4 0††	1.30c	1,080	1.65c	1,100	1.98c 110
Structural shapes	2.35c 11 0 6††	1.27c	1,055	1.65c	1,100	1.93c 107
Plates, †¼-in. or 5 mm.	2.50c 11 14 3††	1.62c	1,350	2.06c	1,375	2.29c 127
Sheets, black	3.37c 15 15 0§	1.92c	1,600‡	2.36c	1,575‡	2.59c 144‡
Sheets, galv., corr., 24 ga. or 0.5 mm	3.95c 18 10 0	2.70c	2,250	4.13c	2,750	6.66c 370
Plain wire	4.17c 19 10 0	1.99c	1,660	2.48c	1,650	3.11c 173
Bands and strips	2.77c 12 19 0††	1.45c	1,210	1.95c	1,300	2.29c 127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling carries a premium of 70.3 per cent over paper sterling.

—The Market Week—

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1.	†11.00
Bos. dock No. 1 exp.	12.00-13.00
New Eng. del. No. 1	13.00
Buffalo, No. 1	14.00-14.50
Buffalo, No. 2	12.00-12.50
Chicago, No. 1	13.50-14.00
Chicago, auto, no alloy	11.50-12.00
Chicago, No. 2 auto	10.50-11.00
Cincinnati, dealers	11.50-12.00
Cleveland, No. 1	12.50-13.00
Cleveland, No. 2	11.00-11.50
Detroit, No. 1	9.75-10.25
Eastern Pa., No. 1	14.00-14.50
Eastern Pa., No. 2	12.50-13.00
Federal, Ill.	12.00-12.50
Granite City, R. R.	12.50-13.00
Granite City, No. 2	12.00-12.50
Los Angeles, No. 1	11.50-12.00
Los Angeles, No. 2	10.00-10.50
N.Y. dock No. 1 exp.	11.50-12.00
Pitts., No. 1 (R. R.)	16.00-16.50
Pittsburgh, No. 1	15.00-15.50
Pittsburgh, No. 2	14.00-14.50
St. Louis, R. R.	12.00-12.50
St. Louis, No. 2	11.50-12.00
San Francisco, No. 1	12.00
Seattle, No. 1	10.00-12.00
Toronto, dirs. No. 1	9.00- 9.50
Valleys, No. 1	13.50-14.00

COMPRESSED SHEETS

Buffalo	12.00-12.50
Chicago, factory	12.50-13.00
Chicago, dealer	11.50-12.00
Cincinnati,, del.	10.25-10.75
Cleveland	12.00-12.50
Detroit	11.50-12.00
E. Pa., new mat.	14.00-14.50
E. Pa., old mat.	10.00-10.50
Los Angeles	12.50-13.00
Pittsburgh	15.00-15.50
St. Louis	10.00-10.50
Valleys	13.00-13.50

BUNDLED SHEETS

Buffalo, No. 1	12.00-12.50
Buffalo, No. 2	11.00-11.50
Cleveland	10.00-10.50
Los Angeles	11.00-11.50
Pittsburgh	14.00-14.50
St. Louis	7.50- 8.00
Toronto, dealers	4.00

SHEET CLIPPINGS, LOOSE

Chicago	9.00- 9.50
Cincinnati, dealers	6.25- 6.75
Detroit	8.50- 9.00
†Los Angeles	3.75- 4.00
St. Louis	7.00- 7.50

BUSHELING

Buffalo, No. 1	12.00-12.50
Chicago, No. 1	12.00-12.50
Cincin., No. 1, deal.	6.50- 7.00
Cincinnati, No. 2	2.75- 3.25
Cleveland, No. 2	7.25- 7.75
Detroit, No. 1, new	10.25-10.75
Valleys, new, No. 1	13.00-13.50
Toronto, dealers	4.00

MACHINE TURNINGS (Long)

Birmingham	†4.50- 5.00
Buffalo	6.50- 7.00
Chicago	6.50- 7.00
Cincinnati, dealers	3.75- 4.25
Cleveland	7.00- 7.50
Detroit	5.00- 5.50
Eastern Pa.	8.00- 8.50
Los Angeles	4.00- 4.25
New York	†3.50- 4.00
Pittsburgh	9.00- 9.50
St. Louis	4.00- 4.50
Toronto, dealers	4.25- 4.75
Valleys	8.50- 9.00

SHOVELING TURNINGS

Buffalo	8.00- 8.50
Cleveland	7.50- 8.00
Chicago	7.00- 7.50
Detroit	6.50- 7.00
Pittsburgh	9.50-10.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	2.00
Buffalo	7.00- 7.50
Cincinnati, dealers	3.25- 3.75
Cleveland	7.50- 8.00
Eastern Pa.	6.00- 6.50
Detroit	5.00- 5.50
New York	†2.50- 3.00
Pittsburgh	7.50- 8.00
Toronto, dealers	3.50

AXLE TURNINGS

Boston district	†7.50
Buffalo	9.50-10.00
Chicago, elec. fur.	13.50-14.00
Eastern Pa.	10.50-11.00
St. Louis	9.00- 9.50
Toronto	5.00

CAST IRON BORINGS

Birmingham	†6.00- 6.50
Boston dist. chem.	†5.00- 5.25
Buffalo	7.00- 7.50
Chicago	5.50- 6.00
Cincinnati, dealers	3.25- 3.75
Cleveland	7.25- 7.75
Detroit	5.00- 5.50
E. Pa., chemical	10.00-11.00
New York	†3.50- 4.00
St. Louis	4.25-4.75
Toronto, dealers	3.50

RAILROAD SPECIALTIES

Chicago	16.50-17.00

ANGLE BARS—STEEL

Chicago	15.50-16.00
St. Louis	14.50-15.00

SPRINGS

Buffalo	16.00-16.50
Chicago, coil	16.50-17.00
Chicago, leaf	16.00-16.50
Eastern Pa.	16.50-17.00
Pittsburgh	17.00-17.50
St. Louis	15.00-15.50

STEEL RAILS, SHORT

Birmingham	†12.00-12.50
Buffalo	17.00-17.50
Chicago (3 ft.)	16.00-16.50
Chicago (2 ft.)	17.00-17.50
Cincinnati, dealers	16.75-17.25
Detroit	16.50-17.00
Los Angeles	15.00-17.50
Pitts., 3 ft. and less	17.00-17.50
St. Louis, 2 ft. & less	14.50-15.00

STEEL RAILS, SCRAP

Boston district	†13.50-14.00
Buffalo	16.00-16.50
Chicago	14.00-14.50
Cleveland	17.00-17.50
Pittsburgh	16.00-16.50
St. Louis	13.75-14.25
Seattle	16.00

FROGS, SWITCHES

Chicago	13.50-14.00
St. Louis, cut	13.50-14.00

ARCH BARS, TRANSOMS

St. Louis	15.00-15.50

PIPE AND FLUES

Cincinnati, dealers	6.00- 6.50
Chicago, net	8.00- 8.50

RAILROAD GRATE BARS

Buffalo	10.00-10.50
Chicago, net	8.00- 8.50
Cincinnati, dealers	7.00- 7.50
Eastern Pa.	13.00-13.50
New York	†8.50- 9.00
St. Louis	8.50- 9.00

RAILROAD WROUGHT

Birmingham	†11.00-11.50
Boston district	†9.50-10.00
Chicago, No. 1 net	9.50-10.00
Eastern Pa., No. 1	15.00-15.50
St. Louis, No. 1	10.50-11.00
St. Louis, No. 2	12.00-12.50
Toronto, No. 1 dlr.	10.00

FORGE FLASHINGS

Boston district	†6.75- 7.25
Buffalo	12.00-12.50
Cleveland	11.50-12.00
Detroit	8.75- 9.25
Los Angeles	nom.
Pittsburgh	13.00-13.50

FORGE SCRAP

Boston district	†6.50
Chicago, heavy	16.50-17.00

LOW PHOSPHORUS

Buffalo, crops	16.50-17.00
Cleveland, crops	18.00-18.50
Eastern Pa., crops	16.50-17.00
Pittsburgh, crops	17.00-17.50

LOW PHOS. PUNCHINGS

Buffalo	15.50-16.00
Chicago	16.50-17.00
Eastern Pa.	17.00-17.50
Pitts. (light & hvy.)	14.50-15.00
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	†14.00-15.00
Boston	15.00-15.50
Chicago	17.50-18.00
New York	†15.00-15.50
Eastern Pa.	17.00-17.50
St. Louis	16.50-17.00

STEEL CAR AXLES

Birmingham	†15.00-16.00
Buffalo	16.50-17.00
Boston district	†16.00
Chicago, net	20.00-20.50
Eastern Pa.	21.50-22.50
St. Louis	18.50-19.00

LOCOMOTIVE TIRES

Chicago (cut)	15.50-16.00
St. Louis, No. 1	14.00-14.50

SHAFTING

Boston district	†14.25
New York	†15.00-15.50
Eastern Pa.	19.50-20.00
St. Louis, 1¼-3¾"	17.00-17.50

CAR WHEELS

Birmingham	†13.50-14.00
Boston dist., iron	†11.00
Buffalo, steel	16.50-17.00
Chicago, iron	14.50-15.00
Chicago, rolled steel	15.50-16.00
Cincin., iron, deal.	13.50-14.00
Eastern Pa., iron	16.50-17.00
Eastern Pa., steel	16.50-17.00
Pittsburgh, iron	15.00-15.50
Pittsburgh, steel	16.00-16.50
St. Louis, iron	13.00-13.50
St. Louis, steel	15.00-15.50

NO. 1 CAST SCRAP

Birmingham	†12.50-13.00
Boston, No. 1 mach.	†10.50-11.00
N. Eng. del. No. 2	11.00-11.50
N. Eng. del. textile	12.50-13.00
Buffalo, cupola	14.50-15.00
Buffalo, mach.	15.50-16.00
Chicago, agri. net	11.50-12.00
Chicago, auto net	13.00-13.50
Chicago, railr'd net	11.50-12.00
Chicago, mach. net	13.00-13.50
Cincin., mach. deal.	12.00-12.50
Cleveland, mach. net	16.75-17.25
Eastern Pa., cupola	16.50-17.00
E. Pa., mixed yard	13.50-14.00
Los Angeles, net	13.50-14.00
Pittsburgh, cupola	15.00-15.50
San Francisco, del.	13.50-14.00
Seattle	10.00-12.00
St. Louis, cupola	11.75-12.25
St. L., No. 1, mach.	14.00-14.50
St. Louis, agr. mach.	12.50-13.00
Toronto, No 1. mach., net	11.00-12.00

HEAVY CAST

Boston dist. break.	†10.25-10.75
New England, del.	†12.50-13.00
Buffalo, break.	11.00-11.50
Cleveland, break. net	13.00-13.50
Detroit, auto net	11.50-12.00
Detroit, break	9.50-10.00
Eastern Pa.	15.50-16.00
Los Ang., auto, net	13.00-13.50
New York, break.	†11.00-11.50
Pittsburgh, break	13.00-13.50

STOVE PLATE

Birmingham	†7.50- 8.00
Boston district	†8.00- 8.25
Buffalo	13.00-13.50
Chicago, net	9.00- 9.50
Cincinnati, dealers	7.00- 7.50
Detroit, net	8.50- 9.00
Eastern Pa.	13.00-13.50
New York, fdy.	†10.00-10.50
St. Louis	10.00-10.50
Toronto, dealers, net	7.50- 8.00

MALLEABLE

Birmingham, R. R.	†10.50-11.00
New England, del.	14.50-15.00
Buffalo	13.50-14.00
Chicago, R. R.	15.50-16.00
Cincin., agri. deal.	11.50-12.00
Cleveland, rail	15.00-15.50
Eastern Pa., R. R.	15.50-16.00
Los Angeles	17.50-18.00
Pittsburgh, rail	14.50-15.00
St. Louis, R. R.	12.50-13.00

Iron Ore

Lake Superior Ore

Gross ton, 51½ % Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbess.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbess.	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-10.00
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, c.i.f. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00
No. Afr. low phos.	13.00
Swedish low phos.	13.00
Spanish No. Africa basic, 50 to 60% nom.	12.00
Tungsten, sh. ton unit, duty pd. nom.	$21.00-22.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$24.50-25.50
Molybdenum ores sulphide, per lb. molybdenum contained, f.o.b. mill	0.75

Manganese Ore

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52%	nom. 35.00
so. African,, 50-52% nom.	35.00
Indian, 50-52%	Nominal

Sheets

Sheet Prices, Page 146

Pittsburgh — Sheet production has increased since the holiday week, aided by additional automotive releases. Shipments to motor car interests are small, although fairly large orders are on producers' books. Galvanized sheet business continues supported to a large extent by active agricultural demand, although orders from warehouses are good, with indications of stocking in some sections. Weakness prevails in galvanized sheets at certain points. Galvanized production was expected to rebound to 60 per cent last week, compared with 51 per cent the preceding abbreviated week. Output of common and full-finished sheets was about 45 per cent.

Cleveland — Sheet specifications still are rising. Demand is well diversified, requirements of miscellaneous consumers accounting for most of recent improvement. Most automotive companies are reported to have contracted for enough steel to satisfy initial runs to supply dealers, and no additional buying of any size is anticipated until a definite sales trend for 1939 models is established.

Chicago — Sheet sales have slackened somewhat, following several weeks of steady improvement. The letdown is expected to be temporary, with the automotive industry counted on to boost demand over coming weeks. Motor car needs so far are well below the anticipated fall peak but constitute the largest single source of business.

Boston—Brisk buying of blue annealed sheets, Nos. 12 and 14 gage, by small tank fabricators continues. Gains in other finishes have been less pronounced, but total tonnage is somewhat heavier with spot orders more numerous. A Worcester district stamping shop asked estimates on 600 tons of hot-rolled pickled annealed to be used in bidding a government order for bombs. Requirements of the building industry are mounting slowly but steadily. Prices are steady, although some waiving of quantity extras is reported in isolated instances in Connecticut.

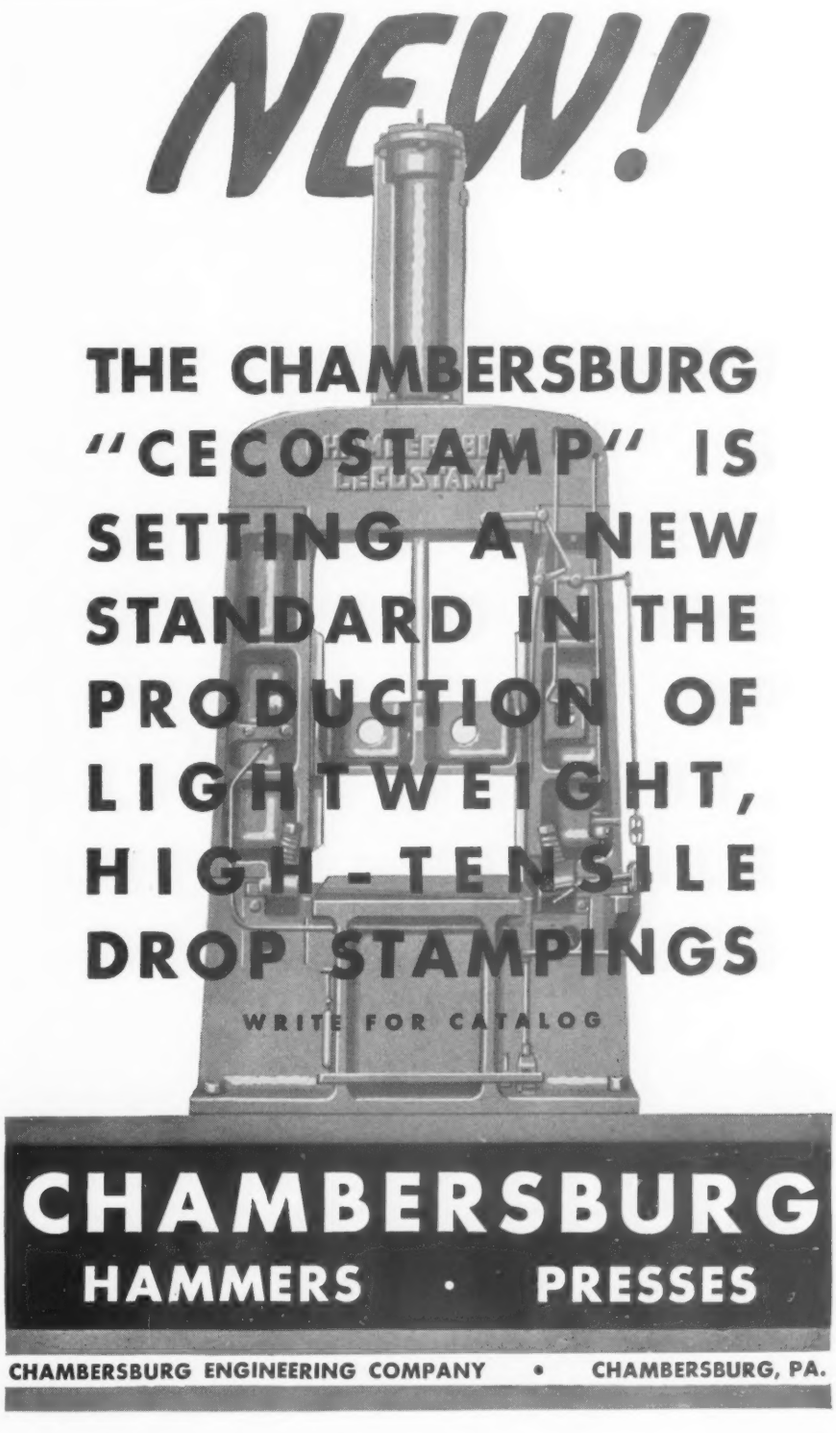
Philadelphia—Additional substantial sheet releases for passenger car and truck body, fender and frame work by at least three district interests are reported. Philco Radio is getting its plant in shape for resumption of work about Oct. 1 following a long strike. Another radio maker here is fairly active.

New York — Sheet specifications continue heavier than a month ago, although orders are not increasing with their recent vigor. Delay in announcing fourth quarter prices has been met in a few cases by acceptance of business for fourth quarter at prices ruling at time of shipment. Demand is diversified and is being bolstered by fair activity in the building trade.

A substantial tonnage of sheets will be purchased here by the American Car & Foundry Co. for 1000 fifty-ton all steel box cars to be built for lease to the Illinois Central.

Buffalo — Sheet demand has turned spotty. Automotive orders are slow to appear and improvement in total business is spasmodic and dependent on miscellaneous buying. While stocks of warehouses and consumers are believed to be at the point where any business increase would mean immediate orders to mills, orders largely are for current needs. Sheet production is unchanged.

St. Louis — Sheet sales and speci-


NEW!
THE CHAMBERSBURG "CECOSTAMP" IS SETTING A NEW STANDARD IN THE PRODUCTION OF LIGHTWEIGHT, HIGH-TENSILE DROP STAMPINGS
WRITE FOR CATALOG
CHAMBERSBURG
HAMMERS · PRESSES
CHAMBERSBURG ENGINEERING COMPANY • CHAMBERSBURG, PA.

fications have increased noticeably since early this month. Purchases for manufacture of stoves and stovepipe are in good volume and demand from the building industry is heavier, particularly for roofing sheets.

Birmingham, Ala.—Some backlog in roofing sheets still is on hand and manufacturing sheets also have continued in improving demand in recent weeks. Production schedules have received no setback from the recent increased rate, which for two months has been in sharp contrast with the first half of the year. Continued advances are expected.

Strip

Strip Prices, Page 147

Cleveland—Miscellaneous consumers dominate demand for hot and cold-rolled strip as releases from automotive interests have not increased markedly. Orders from many users continue on a hand-to-mouth basis, as indicated by frequent requests for prompt delivery. Absence of a definite fourth quarter price recently minimized incentive to purchase ahead of actual needs, with business accepted on the basis of quotations in effect at time of shipment.

Pittsburgh—Strip production is feeling the effects of automotive buying, output of both hot and cold rolled material continuing to gain slowly. The rate is moderately above 30 per cent.

Boston—Hot strip buying, recently bolstered by the placing of several attractive tonnages, is less active. Narrow cold strip demand holds to the recently improved rate, but additional gains are slight. While some business has been placed by the automotive industry, the larger part of fourth quarter requirements remains to be ordered. Forward buying is scant.

New York—Rerollers of narrow cold strip in some instances are operating about 55 per cent, reflecting recent improvement in business. While new sales show but slight additional pickup, recent gains are maintained. Orders are small but slightly more numerous for early shipment. Hot strip demand is a trifle heavier.

Philadelphia—Little change is noted in narrow strip specifications, and prices remain steady. China recently placed 2000 tons of cold-rolled strip with a foreign producer which under-quoted domestic mills.

Plates

Plate Prices, Page 146

Pittsburgh—Dravo Corp. has received an order from Ethyl-Dow Chemical Co., Wilmington, Del., for a welded, flush-deck type barge. The unit will be fabricated at the former's Neville Island shops and assembled at the Dravo shipyard, Wilmington.

Cleveland — Steel plate demand is limited to comparatively small lots for miscellaneous needs. Little tonnage is required for grade crossings and other bridge work and business from railroads remains at a minimum. Inquiries for boilers and other specialty work have failed to show anticipated improvement.

Boston — For specified projects plate requirements have stepped up, contracts for tanks taking 650 tons having been placed. Large diameter steel pipe needs are also looming, preliminary inquiry for 15,000 to 18,000 feet, 48-inch pipe in connection with a subway project, Boston, being out. An eastern mill is also re-

HAVE YOU Your Copy

OF THIS MANUAL OF 1938's MATERIAL HANDLING METHODS?

Send for it Now!

This new book gives comprehensive information on how the nation's leading industries are slashing handling costs. It shows how you, too, can save hundreds of dollars in the lifting, lowering or moving operations in your plant. Its suggestions for the simple application of P&H Hoists will apply to your needs whether you are operating a machine shop or a steel mill—an oil field, warehouse or a cannery—a package plant or a power house. And it's yours—free of charge. Just fill in this coupon and send it today—your copy will reach you by return mail.

HARNISCHFEGER CORPORATION

HOISTS • WELDING ELECTRODES • MOTORS P&H EXCAVATORS • ELECTRIC CRANES • ARC WELDERS

HARNISCHFEGER CORPORATION, 4411 W. National Ave., Milwaukee, Wis.
Please send me my copy of Bulletin H-5, "Handle it off the floor." We operate a..... (type of plant), handling loads weighing..... lbs.
Firm name..... By..... Title.....
Address..... City..... State.....

Send This Coupon—NOW!

ported to have booked a large order for 14 miles, 48-inch, for installation in New England, taking several thousand tons. Several large standpipes will be out for figures shortly under the PWA program. Shipyard releases are steady and industrial demand is gaining, a Lynn, Mass., fabricator placing 250 tons after a long period of inactive buying. Current gains are made without much assistance from boiler and structural shops.

New York — Plate buying has moderated, although sales so far this month are ahead of the corresponding August period, and some fairly good tonnages are in prospect. Plates required for the 1000 steel box cars to be built for American Car & Foundry Co. for the Illinois Central will be purchased here, but the equipment will be built in the Midwest.

Philadelphia—Fabricators of domestic oil storage tanks are specifying light plates more actively, but small tank and boiler shops generally are not showing the anticipated pickup in buying. Shipbuilders are taking a few more plates, following substantial releases a week ago. Railroad buying again is practically dormant since the Pennsylvania has placed material required for its car-building program. It is understood the entire Brazilian order for 26 locomotives is being placed in another district.

St. Louis—Outlook for plate business is better. Miscellaneous demand has increased noticeably, while inquiries from oil companies are fairly heavy. Shell Oil Co. will require a substantial tonnage to replace equipment damaged by fire at its Wood River, Ill., plant. A barge builder is reported in the market for about 12,000 tons. St. Louis Railway association will reopen its shops within the next two weeks, and other railroads with local terminals are planning more active repair work this fall.

Birmingham, Ala. — Plates have not shown marked improvement this month. Demand remains fair, however, with spotty orders being sustained. Inquiries are in small demand.

San Francisco—Plate inquiries are confined to lots of less than 100 tons. Bids have been opened on 200 tons for a water tank and tower for Wickenburg, Ariz. Plate awards so far this year total 25,130 tons, against 31,989 in the corresponding 1937 period.

Plate Contracts Placed

200 tons, three tanks, Dead River Oil Co., Calais, Me., to Chicago Bridge & Iron Co., Chicago.

200 tons, two tanks, Webber Oil Co., Chicago.

150 tons, tanks, Frederick Scudder Coal Co., Sandwich, Mass., to Chicago Bridge & Iron Co., Chicago.

115 tons, two 10,000-barrel tanks, Freedom Oil Co., Freedom, Pa., to Hammond Iron Works, Warren, Pa.

100 tons, two tanks, American Oil Co., Hartford, Conn., to Chicago Bridge & Iron Co., Chicago.

Plate Contracts Pending

250 tons, pre-fabricated sections for one utility barge and one derrick boat, United States engineer, Fort Peck, Mont.; Treadwell Construction Co., Midland, Pa. low, f.o.b. basis bids Sept. 6.

Bars

Bar Prices, Page 146

Pittsburgh — Cold finishers are taking a large portion of current output of hot-rolled bars. Demand elsewhere is increasing, however, business gaining in spite of absence of large automotive orders and railroad buying. Sales to jobbers show a steady increase, reflecting growing demand from warehouse customers.

Cleveland — Carbon and alloy

● A good impression, in the shape of steel stampings, is formed by high speed presses when Thomas Cold Rolled Strip is used. Thomastrip is rolled to match the job, and the selected finishes make for better and more economical production. In addition to bright cold rolled strip, there are electro coated finishes in copper, zinc, brass, and nickel . . . every one of which satisfies specific demands. Send for samples or have a Thomas representative call so that you may actually know the advantages of Thomastrip in your production.

THE THOMAS STEEL COMPANY • Warren, Ohio

SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL

steel bar producers report continuation of general improvement in demand noted late in August. Specifications from machinery manufacturers and automotive suppliers have bolstered bookings this month about 10 per cent. Needs of farm equipment builders have been below previous estimates and railroad orders are scant.

Chicago—Carbon and alloy bar demand is being maintained. A slackening in miscellaneous buying early last week later was offset by heavier requirements of automotive interests. Better demand also has appeared from some tractor builders, while forging shops are taking fair tonnages. Some producers look for a moderate revival in farm equipment manufacturers' needs.

New York—Commercial bar business has leveled off, but barring further complications in the European situation, sellers look for further expansion shortly. Consumers' stocks are low and an increasing amount of work is in sight, notably for the automotive industry and to a lesser degree for the railroads. A number of roads are quickening their shop activities. Hot rolled alloy bars and cold-drawn material are moving better than plain carbon bars. Demand for munitions manufacture continues to expand, both from the government and from private companies with government contracts.

Boston—Improvement in bar demand is spotty, small orders for alloys making relatively the best showing. Soft steel bars are lagging. Forging material is slightly more active. Consuming outlets for alloy bars are widely diversified. Prompt delivery is asked on practically all orders. Jobbers are buying more frequently, but in small lots.

Philadelphia — The Chester, Pa., shipyard has placed a substantial tonnage of bars for C-2 boats, and additional releases are anticipated. Automotive partsmakers also have issued releases for work on new models, while textile machinery makers are still taking fair tonnages of cold-drawn material. Other machinery interests are moderately active. Domestic sellers lost a 1000-ton export order for shell bars to an Austrian mill which bid $10 a ton less.

Buffalo—Small diversified orders provide principal support to bar orders. With automotive demand still light, stamping and forging plants are buying sparingly. Structural requirements are the heaviest among new orders. Better activity at local car shops brightens prospects of increased railroad consumption. Bar mills are maintaining fairly active rolling schedules.

Birmingham, Ala. — Demand for bars has not shown any gain above the slight seasonal increase. Tonnage has remained at a moderate level of late.

32 years
1906-1938
Dependable
..SERVICE
..QUALITY

DAMASCUS MANGANESE AND ALLOY CASTINGS

Manganese and Alloy Steel Castings One Half to One Thousand Pounds Produced in our modernly equipped foundry from electric furnace steel and heat-treated in automatically controlled gas-fired furnaces.

DAMASCUS STEEL CASTING CO.
New Brighton, Pa.
(Pittsburgh District)

Pipe

Pipe Prices, Page 147

Cleveland — Jobbers of standard steel pipe note little variation in demand, as industrial needs remain at a minimum. National Construction Co., Cleveland, was low on approximately 1000 tons of 42-inch steel pipe for a new intake, Sandusky, O. However, all bids were over the estimate and therefore the project will be rebid Sept. 28. Cast iron pipe requirements continue to expand. U. S. Pipe & Foundry Co., East Burlington, N. J., was recently awarded 240 tons of cast pipe for a new water distribution system at Smithfield, O. Prices for both cast and steel pipe are firm.

Chicago — Texas Pipe Line Co., Tulsa, Okla., has announced plans for building an 80-mile pipe line from Salem to Lawrenceville, Ill., in the newly developed oil field of

this state, 60 miles of 8-inch pipe and 20 miles of 10-inch. While prospects for fairly heavy orders for cast iron pipe this fall are bright, recent bookings have been light. Pending inquiries generally are small but numerous. Some improvement in private construction is in sight, but government projects and municipal work financed by federal funds offer the best sources of business.

Boston—Cast pipe buying continues active, with releases substantial. The district foundry continues on a five-day week. Some eastern foundries are pushed to make prompt deliveries on smaller diameters. Awards include 600 tons for Colchester, Mass., and New Haven, Conn., the latter being a procurement division purchase. Replacement orders for steel pipe by resellers are in greater volume and resale prices in most sections are steady, although some weakening is noted in southern New England. Wrought pipe has also shared in the moderate improvement.

New York — Except for requirements of several housing projects, few large pipe orders are current, although there is a moderately good volume of miscellaneous inquiry, principally for construction work. In addition to several other housing projects previously noted, the Queens Bridge units, taking a substantial pipe tonnage, is expected to come up for bids shortly.

Larger inquiries for cast pipe approximate 550 tons. Part of 2500 tons estimated for up-state work has been placed by contractors. Utilities are buying little. New inquiries include 200 tons each for Rockville Center, N. Y., and for a force main and pumping connections, Queens. Approximately 3000 tons of 8 and 10-inch steel pipe will be bought shortly by the Texas Co., this city.

Birmingham, Ala. — Government lettings have been the bright spot in pipe demand and a fair increase in buying is getting under way. Pipe plants have made preparations to increase production when the government program gets fully under way.

San Francisco — Cast pipe bookings of nearly 1000 tons include 282 tons, 281 tons and 256 tons for Tuscon, Ariz., Tacoma, Wash., and Fresno, Calif., respectively, all to United States Pipe & Foundry Co. Awards for the year to date total 23,099 tons, against 22,326 tons a year ago. Phoenix, Ariz., will hold a bond election Sept. 27 on a $1,174,725 waterworks improvement system, including 36-inch pipe. Santa Rosa, Calif., has voted bonds for $130,000 for water and fire system improvements, total cost $230,000.

Seattle — Inquiry is increasing as PWA funds are granted for municipal improvements. H. G. Purcell, Seattle, has booked for United States Pipe & Foundry Co., Burlington, N. J., 250 tons of 12-inch for Tacoma, which has a $1,575,000 system improvement project for which PWA has increased its allotment to $709,200. About 100 tons steel pipe are involved in districts 50 and 54, Seattle, bids opened Sept. 14 by Parker & Hill, Seattle, engineers. Stevens & Koon, Portland, engineers, have prepared plans for an improvement water system project at Corvallis, Oreg. Unstated interests have booked 100 tons for Billings, Mont. and an unstated tonnage for Glasgow, Mont.

Cast Pipe Placed

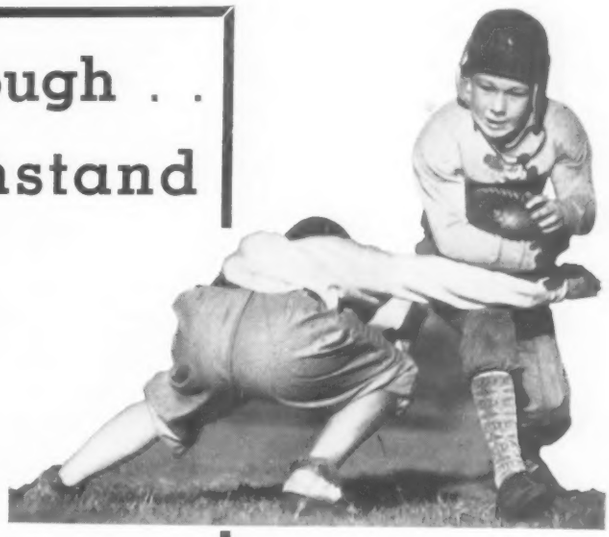
1800 tons 21-inch, Watervliet, N. Y., to R. G. Wood & Co., Florence, N. J.

1000 tons, 6 to 20-inch, Pawtucket, R. I., to United States Pipe & Foundry Co., Burlington, N. J.

425 tons, 10-inch and under, Colechester, Mass., to United States Pipe & Foundry Co., Burlington, N. J.

282 tons, 4 to 12-inch, Tucson, Ariz., to United States Pipe & Foundry Co.,

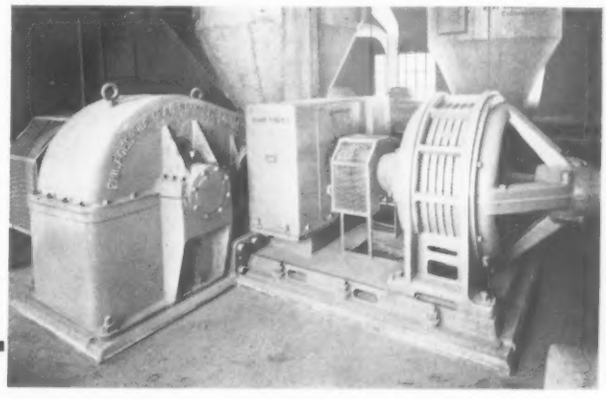
Built tough . . to withstand Shock



Two bodies meet on the football field . . . the shock is terrific and unless the boys are rugged, "time-out" may follow.

Also, in the field of power transmission, shock is one factor that oftentimes must be considered before selecting a speed reducing unit. Philadelphia Herringbone Units are built to resist shock, to meet frequent reversals and withstand heavy intermittent loads. These units operate with smooth, comparatively quiet gear action, can transmit great power through relatively small gears, are space conserving, efficient, trouble-free and long wearing. Write us for full details about them.

The PHILADELPHIA HERRINGBONE SPEED REDUCER *shown here operates a large conveyor*



PHILADELPHIA HERRINGBONE *Speed Reducers*

Philadelphia Gear Works
Industrial Gears and Speed Reducers
Erie Avenue and "G" Street
PHILADELPHIA

Behind the Scenes with STEEL

Allen, Take A Bow

■ For something over ten years now, STEEL has been running Mirrors of Motordom every week. This one feature has probably attracted more attention and had more praise heaped on its shoulders than any similar section of any industrial magazine in the country. Everyone has a natural interest in Detroit's activities and since the automotive companies are the largest consumers of steel and one of the most progressive fields of metal fabricating a clear picture of developments is worth plenty to anyone who produces metals or manufactures a finished product. So, we have become somewhat calloused to the constant flow of commending letters, but two last week had a touch that caught our fancy. Along with a money order renewing his subscription E. B. of Detroit enclosed a handwritten note: STEEL *very fine. Congratulations on your Mirrors of Motordom column. Almost best single feature of the magazine.* (Damn this pen). *Yours for continued success.* We like that part about Mirrors being *almost* the best feature. E. B. is a guy who really appreciates us and we've put him down on our Xmas list for a new pen. And then from over in Bridgeport, Conn. G. F. H. writes: *I take the magazine,* STEEL. *The Mirrors of Motordom I like very much, in fact, quite a few in the neighborhood.* We'd like to see one of those copies after it has gone the rounds. It probably has thumbprints of everyone on this side of the street up as far as the railroad tracks, a toe print of Granpa Snazzy who lives with the folks around the corner, and red raspberry jam prints from that tow-headed tot with the funny eyes.

Too Good

■ And then a compliment of another sort came in from a San Leandro, California company to whom we sent a recent letter suggesting they'd find it well worth their while to have STEEL once again every week. They replied: STEEL *is a wonderful book containing valuable information but we do not need it at present.*

Expensive Pastime

■ Out in Chicago one of the scrap dealers was bemoaning his sad plight and going on at great length about how he lost $10,000 in June, $20,000 in July and $30,000 in August. A sympathetic friend listened seriously and when he heard this he asked the dealer why on earth he didn't quit. He is still trying to figure out the answer, "Well, I have to make a living someway!"

Hard Tax

■ And speaking of making a living, one of our little group writes that only 43 people out of the 130,000,000 in the U. S. made more than a million dollars in 1937. He says their aggregate income was 73 million dollars. And if every penny was squeezed from them it would barely meet the federal government expenditures for 48 hours. He goes on to prophecy the gov. will spend over a billion a month in 1939—more than 34 million each day. You will find the tax payers are going to have their hands full, he concludes but it seems to us that is putting it a bit mildly. We would suggest that most of us have had our bellies full for some time now.

Are You Coming?

■ This week in Cleveland industrial advertising managers and sales promotion men get together for their annual N.I.A.A. conference. We believe it is not out of place to hope that from what they discuss and learn in their meetings newer and more effective sales plans will come, resulting in more production and more jobs. If your adv. mgr. doesn't have his bag packed and his ticket bought for Cleveland hurry him along and while he's here he is welcome to drop in and say hello to—

SHRDLU

Burlington, N. J.
256 tons, 4 to 12-inch, Fresno, Calif., to United States Pipe & Foundry Co., Burlington, N. J.
250 tons, 12-inch for Tacoma, Wash., to H. G. Purcell, Seattle, for United States Pipe & Foundry Co., Burlington, N. J.
340 tons, water distribution system, Smithfield, O., to U. S. Pipe & Foundry Co., East Burlington, N. J.
170 tons, 10,392 feet, 6-inch, state procurement officer, treasury department, New Orleans, to United States Pipe & Foundry Co., Birmingham, at 80 cents per foot; bids Sept. 6.
170 tons, 6-inch, procurement office, New Haven, Conn., 150 tons, 9024 feet, to United States Pipe & Foundry Co., Burlington, N. J. at 84 cents per foot and 1200 feet to Warren Pipe Co., Everett, Mass. at 79 cents per foot; bids Sept. 6.
100 tons, 10-inch class C, Mount Vernon, N. Y., to Donaldson Iron Works, Emaus, Pa.; bids Sept. 14.

Cast Pipe Pending

938 tons, 16-inch under water line, Eleventh naval district, San Diego, Calif.; United States Pipe & Foundry Co., Burlington, N. J., low on 253 tons and balance rejected and new bids taken Sept. 15 for 388 tons of 16-inch.
825 tons, 6 and 12-inch, Pacific Colony, Spadra, Calif.; bids opened.
600 tons, 54-inch, Medford, Mass., metropolitan district commission, Boston.
231 tons, 4 to 12-inch, Martinez, Calif.; bids Sept. 21.
200 tons, 12-inch, Rockville Center, N. Y.; bids Sept. 21, alternates on cast iron or steel.
200 tons, mostly 14-inch, force main and pumping connections, Queens, N. Y.; bids Sept. 19.

Steel Pipe Pending

1000 tons, 42-inch, new intake, Sandusky, O.; new bids Sept. 28. National Construction Co., Cleveland, low on original bids Sept. 7, but all were over estimates.
100 tons, water districts 50 and 54 Seattle; bids in to Parker & Hill, engineers, Seattle.
Unstated tonnage, 60 miles of 8-inch, 20 miles of 10-inch line pipe for Texas Pipe Line Co., Tulsa, Okla., to be laid from Salem to Lawrenceville, Ill.
Unstated tonnage, gas line from southwestern Kansas to Mesaba iron range, Minnesota, together with branch and lateral lines, for Kansas Pipe Line & Gas Co.

Wire

Wire Prices, Page 147

Pittsburgh—Business in wire and wire products continues to improve. Manufacturers' wire demand is supported principally by automotive builders and partsmakers but orders from miscellaneous consumers, for a number of weeks the leading source of business, have increased noticeably. Jobber buying reflects gains in consumption rather than additions to stocks. Farm consumption of merchant products is retarded by the season but is counted on for more activity with the completion of the harvests.

Cleveland—Specifications for wire

and wire products show gains and finishing mill operations have improved further. Requirements of auto partsmakers dominate demand here, with additional business in sight. Sales of merchant products also have been heavier.

Chicago—Wire demand is gaining slowly, with larger automotive orders in sight. Farm needs of merchant wire products are not expected to increase materially until later in the year. Paving work in the southern and north central states continues to take good amounts of wire mesh, and this business is expected to hold up until early winter.

Boston—Wire orders from the automobile accessory trade and most manufacturing lines are improved, but the accelerated pace attained late last month has been retarded slightly. Finishing operations in some departments range from 50 to 60 per cent. Demand is well diversified, with prompt delivery specified. There is little advance buying. Electrical goods and some specialties are moving better in spots. Demand for merchant products, including nails, holds up well in the larger distributing points.

New York—While wire demand has recovered from the early-September decline, additional progress has been slight and incoming tonnage has leveled off. The manufacturing trade is furnishing diversified business, with early shipment requested. Spring wire buying by the furniture trade is sustained, but little tonnage is coming from the automotive industry. Spinning has started on the suspension cable for the Bronx-Whitestone bridge, New York. American Steel & Wire Co. is supplying nearly 4500 tons of cable wire, wrapping wire and suspender ropes.

Rails, Cars

Track Material Prices, Page 147

With American Car & Foundry Co. to build 1000 50-ton steel box cars for leasing to the Illinois Central, this month will be the best since June, when domestic carriers placed 1178 freight cars, and it may prove better. With at least 1100 cars already placed, it is easily possible that even the June figure will be surpassed and that September will prove the second best month of the year to date, second to May, when 6014 were placed.

Richmond, Fredericksburg & Potomac has asked interstate commerce commission permission to issue $740,000 in equipment certificates for purchase of six steam locomotives and six baggage-express cars. Locomotives have been placed with Baldwin Locomotive Works, Philadelphia, and cars with American Car & Foundry Co., New York, pending commission decision. Union Pacific has leased 50 lightweight steel box cars from Pullman-Standard Car Mfg. Co., with option to buy.

Chicago & Illinois Midland has given Pullman-Standard Car Mfg. Co. repairs on 100 seventy-ton gondolas, involving about 1000 tons of steel. This road will rebuild 50 cars of the same type in its own shops, requiring about 500 tons.

On 12 subway cars for the New York board of transportation, on which bids were opened Sept. 13. Magor Car Corp., Passaic, N. J., and St. Louis Car Co., St. Louis, are apparently low bidders.

New York Central railroad will open bids Oct. 3 on at least 28,600 tons of rails, plus accessories.

St. Louis Car Co. has been awarded 12 coaches by the Southern Railway, the list comprising six diesel-powered combination baggage and mail cars and six passenger cars with steel partitions.

Track bolts have been reduced from 4.35c, base, to 4.15c, the first change in track fastenings in a considerable time. No revision was made at the time machine and other bolts were reduced recently.

Car Orders Placed

Chicago & Illinois Midland railway, 100 seventy-ton gondolas, to be rebuilt by Pullman-Standard Car Mfg. Co., Chicago.

Illinois Central, 1000 fifty-ton steel box cars to American Car & Foundry Co., New York; leased, with option for purchase.

Richmond, Fredericksburg & Potomac, six baggage-express cars, to American Car & Foundry Co., New York, subject to interstate commerce commission permission to issue equipment certificates.

Southern Railway, six diesel power combination baggage and mail cars and six passenger coaches, to St. Louis, Car Co., East St. Louis, Ill.

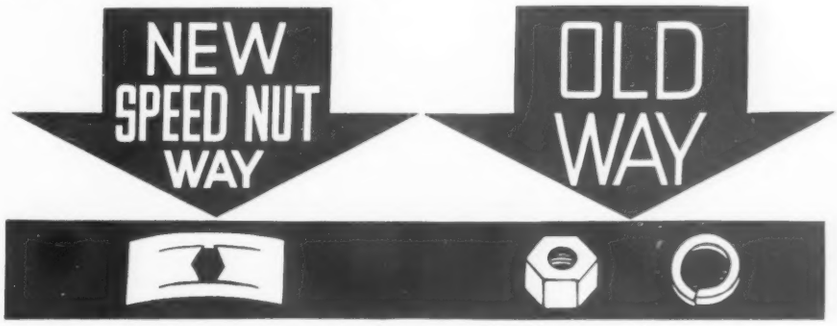
Union Pacific, 50 lightweight steel box cars leased from Pullman-Standard Car Mfg. Co., Chicago, with option to purchase.

Locomotives Placed

Richmond, Fredericksburg & Potomac, six steam locomotives, to Baldwin

Stop! THAT DRAG IN YOUR ASSEMBLY LINE

BY USING Speed Nut System (PATENTED) OF ASSEMBLY



One speed nut replaces nut and lock washer
Net cost about one-half with speed nuts

Practically any product fabricated wholly or partially with sheet metal can be improved with the SPEED NUT System of Assembly. In the majority of cases, net costs are cut in half. One SPEED NUT takes the place of both threaded nut and lock washer. Weight is reduced. Number of pieces are cut in half. Parts are assembled better, faster and held under firm spring tension.
SPEED NUTS absorb expansion and contraction from temperature changes. Eliminate panel bulges. Stop checking and crazing of porcelain surfaces. Eliminate vibration. And the harder the pull, the firmer the SPEED NUT grips. Manufactured of spring steel, cold rolled steel, phosphor bronze and stainless steel for most standard sizes of machine screws, metal screws, metal rivets and plastic studs. Write for samples and prices today, explaining sizes and uses you contemplate.

SPEED NUT DIVISION TINNERMAN STOVE & RANGE CO.
2039 Fulton Road, Cleveland, Ohio
Manufacturers of Patented SPEED NUTS

Locomotive Works, Philadelphia, subject to permission from interstate commerce commission to sell equipment certificates.

Shapes

Structural Shape Prices, Page 146

New York — Including 7000 tons for an elevated highway, Queens, N. Y., structural steel contracts involve close to 60,000 tons in this area. New inquiry is lower, but more small-lot projects are up for estimates taking 200 tons or less. General contracts have been awarded for New York state bridges, involving 600 tons.

The outstanding award of the year to-date involving 50,000 tons, for the Metropolitan Life Insurance Co.'s housing project, Bronx, N. Y., has been awarded to Bethlehem Steel Co., Bethlehem, Pa.

Pittsburgh — While activity in the shape market has quieted somewhat, considerable tonnage still is pending. Both the number and total tonnage of new contracts are smaller. Private construction still is slow, the bulk of new inquiries being for public works.

Cleveland — Structural market is substantially unchanged, with only a few large projects up for bids, mostly public work with a mild improvement in inquiries from private sources, although in small tonnages. Bethlehem Steel Co. was recently awarded 136 tons for the women's gymnasium, Oberlin college, Oberlin, O. Award for the west approach to the Main street bridge, Cleveland, is expected early this week.

Chicago — Fabricated shape demand is holding well, although recently a slight slackening has been noted. However, prospects the next few months are fairly bright, with large government projects expected to take substantial tonnages well into the winter. Small jobs are fairly numerous, nearly 3000 tons being involved in about 100 new inquiries.

Boston — Structural contracts and inquiry are more numerous, but few large tonnages are involoved. Small-lot awards, 50 to 100 tons, have increased materially. Shops at the Portsmouth, N. H., navy yard take 200 tons and a like amount is required for a Providence, R. I., postoffice annex, bids Oct. 7. Most small bridge contracts have been placed, a new inquiry for Rollinsford, N. H., calling for 100 tons.

Philadelphia — Several fair jobs are before the trade, but public spending has not made influence fully felt yet. Philadelphia navy yard takes bids Sept. 19 for a warehouse involving 500 tons; on Oct. 5 for a machine shop taking 600 tons and a structural assembly shop involving 500 tons. Smaller fabricators report some increase in residential and industrial alteration work.

Buffalo — The structural shape market will show new life this week as the $5,000,000 Lakeview housing project, involving 2140 tons of structural, reinforcing, roofing and trim steel will be bid on Tuesday. On the same day the 600-ton new building of the Spencer Lens Co., Cheektowaga, N. Y., is up for bids. This is the first private industrial building of any size in quite some time.

San Francisco—Recent structural awards totaled only 3132 tons, bringing the total for the year to date to 98,055, compared with 123,598 tons a year ago. Several large tonnages are pending, including 5487 tons for the Prado dam, Orange and Riverside county, California.

Seattle — Shapes continue to set the pace for other steel markets. Many projects are up for figures and indications point to better than normal volume for the remainder of the year. The week's awards were not heavy but considerable business is pending, most important being the $5,400,000 suspension Narrows bridge near Tacoma, bids postponed to Sept. 27 at Olympia.

Shape Contracts Placed

50,000 tons, Metropolitan Life Insurance Co. housing project, Bronx, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; through Starret Bros. and Eken, New York, general contractors.

7000 tons, elevated highway and approaches, 45th to 64th street, Queens, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; Elmhurst Contracting Co., New York, general contractor.

3000 tons, conduit lining, bureau of reclamation project, Odair, Wash., to Puget Sound Machinery Depot, Seattle

3000 tons, piling, North avenue pier and jetties, Chicago, to Carnegie-Illinois

Shape Awards Compared

	Tons
Week ended Sept. 17	**74,830**
Week ended Sept. 10	**18,088**
Week ended Sept. 3	**26,428**
This week, 1937	**16,548**
Weekly average, year, 1937	**23,251**
Weekly average, 1938	**19,127**
Weekly average, August	**28,101**
Total to date, 1937	**965,917**
Total to date, 1938	**726,833**

Includes awards of 100 tons or more.

BY THE BOX OR BY THE MILLION!

You can get BOTH BRIGHT & HIGH CARBON CAP SCREWS from stock!

• Cleveland Cap Screws produced in full bright finish give you the best in appearance with adequate tensile strength. High carbon heat treated Cleveland Cap Screws insure maximum strength with good appearance. Made by the Kaufman Process, *patented*, our own plant development, both are equally accurate in all dimensions and a Class 3 thread fit. Both types of Cleveland Cap Screws are available in fine and coarse thread, either out of stock, or made to your specifications in any quantity desired. THE CLEVELAND CAP SCREW COMPANY, 2935 East 79th Street, Cleveland, Ohio.

Address the Factory or Our Nearest Warehouse:

CHICAGO, 726 W. Washington Blvd.
PHILADELPHIA . 12th & Olive Sts.
NEW YORK . . . . 47 Murray Street
LOS ANGELES . 1015 East 16th St.

CLEVELAND CAP SCREWS
SET SCREWS • BOLTS AND NUTS

Steel Corp., Chicago, by Fitzsimons & Connell Dredge & Dock Co., general contractors.

850 tons, addition to office building, Humble Oil & Refining Co., Houston, Tex., to Mosher Steel Co., Houston.

750 tons, armory building, Hannibal, Mo., to Illinois Steel Bridge Co., Jacksonville, Ill., $63,000; bids in on steel direct, city clerk, Hannibal.

585 tons, building, United States Gypsum Co., Jacksonville, Fla., to Virginia Bridge Co., Roanoke, Va.

540 tons, bridge, state project RC-3983, Buffalo road, Monroe county, New York, to Bethlehem Steel Co., Bethlehem, Pa.; Potter-DeWitt Corp., Pavilion, N. Y., general contractor at $138,413.50, bids Aug. 16, Albany.

480 tons, superstructure, Red Hook housing project, Brooklyn, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; George A. Fuller Co., New York, general contractor.

445 tons, armory, Manchester, N. H., to Lyons Iron Works Inc., that city.

400 tons, miscellaneous projects including 200 tons wharf and warehouse, McNeil Island, Wash., to Standard Steel Fabricating Co. & Boiler Works, Inc., Seattle.

395 tons, storage building, navy yard, Bremerton, Wash., to Bethlehem Steel Co., Bethlehem, Pa.

363 tons, extension building 368, navy yard, Bremerton, Wash., to Wisconsin Bridge & Iron Co., Milwaukee.

350 tons, grade separation project, Forty-ninth street and Ashland avenue, Chicago, to Bethlehem Steel Co., Bethlehem, Pa.

325 tons, school, Glen Rock, N. J., to Lafayette Iron Works, New York, direct.

315 tons, two warehouses, Chanute field, Rantoul, Ill., for United States government, to Mississippi Valley Structural Steel Co., Decatur, Ill.

315 tons, warehouse, Westinghouse Electric & Mfg. Co., Sharon, Pa., to Minnote Bros., Pittsburgh.

300 tons, sheet piling, bulkhead, Grays Harbor, Wash., to Bethlehem Steel Co., Bethlehem, Pa.

300 tons, Parcel Post building, Los Angeles, to unnamed interest.

280 tons, repairs to main towers, Williamsburg bridge, New York city, awarded through local procurement division of treasury department, to American Bridge Co., Pittsburgh.

275 tons, shapes and bars, library building, University of Alabama, Tuscalossa, Ala., to Bethlehem Steel Co., Bethlehem, Pa., and Concrete Steel Co., Birmingham; Batson-Cook Co., West Point, Ga., general contractor.

265 tons, including 54 tons sheet piling, Russian river bridge, Sonoma county, California, to Judson-Pacific Co., San Francisco.

250 tons, repairs to mess hall, Annapolis, Md., for navy, to Bethlehem Steel Corp., Bethlehem, Pa.

235 tons, bridge FAGS-18, Letcher county, Kentucky, to St. Louis Structural Steel Co., East St. Louis, Ill.

210 tons, two warehouse buildings, Scott Field, Ill., to Superior Structural Steel Co., St. Louis.

200 tons, conveyor system for Coulee dam project, to Isaacson Iron Works, Seattle.

195 tons, bridge, Hillsboro county, Florida, to Tampa Shipbuilding & Engineering Co., Tampa, Fla.

190 tons, temporary bridge over sanitary canal, Western avenue and Thirty-first street, Chicago, to Bethlehem Steel Co., Chicago.

190 tons, eight dump scow doors, Fairport, O., to Fort Pitt Bridge Works, Pittsburgh.

185 tons, college building, for Province of St. Augustine of Capuchin order, Herman, Pa., to Ingalls Iron Works, Birmingham, Ala.

180 tons, highway bridge, Cumberland county, Pennsylvania, to Bethlehem Steel Co., Bethlehem, Pa.; through Blue Ridge Stone Co., New Tripoli, Pa.

175 tons, curb angles, procurement division, treasury department, New York, to Phoenix Bridge Co., Phoenixville, Pa.

170 tons, swing bridge, Rehoboth, Del., to Pittsburgh Des Moines Steel Co., Pittsburgh.

165 tons, Central school, Ellenburg, N. Y., to Bethlehem Contracting Co., Bethlehem, Pa.; through Andrew Weston Co., general contractor.

165 tons, skating rink, Brighton, Mass., to New England Structural Co., Everett, Mass.

165 tons, guard gates, Lot 41, Ohio river, for United States Engineer, Louisville, Ky., to Bedford Foundry & Machine Co., Bedford, Ind.

150 tons, skating rink, Boston, to New England Structural Steel Co., Everett, Mass.

150 tons, state bridge FAP-351-E, Strasburg, Colo., to Kansas City Structural Steel Co., Kansas City, Kans.

150 tons, alterations, American Terminal Warehouse, Buffalo, to R. S. McMannus Steel Construction Co. Inc., that city.

140 tons, South Seventieth street bridge, Milwaukee, to Worden-Allen Co., that city.

136 tons, gymnasium building, Oberlin college, Oberlin, O., to Bethlehem Steel Corp., Bethlehem, Pa.

135 tons, hospital, Danbury, Conn., to Standard Structural Steel Co., Hartford, Conn.; through M. A. Connor Co., Hartford, general contractor.

125 tons, addition, B. F. Goodrich Co., Oakes, Pa., to American Fabricated Steel Co., Philadelphia.

120 tons, bridge, project FAS-93A, Carrol county, Georgia, to Taylor Iron Works & Supply Co., Macon, Ga.

111 tons, state bridges, Guildford and Brooklin, Vt., to Bethlehem Steel Co., Bethlehem, Pa.; through Raymond J. Pierce, Brattleboro, Vt.

105 tons, bridge, Mt. Pleasant, Mich., to American Bridge Co., Pittsburgh.

100 tons, bureau of roads bridge Rainier National park, to Isaacson Iron Works, Seattle.

100 tons, sheet steel piling, bulkhead at customs house, Ketchikan, Alaska, to Bethlehem Steel Co., Seattle.

100 tons, church, Seventy-fourth street and York avenue, New York, to Bethlehem Fabricators Inc., New York; through Hegeman Harris Co., New York.

Unstated tonnage, medical building, No. 8 White River Junction, Vt., to Haar-Man Steel Co., Holyoke, Mass.; through J. G. Roy & Sons Co., Springfield, Mass.

Shape Contracts Pending

6000 tons, two bridges over Black river, Lorain county, Ohio; bids expected in November.

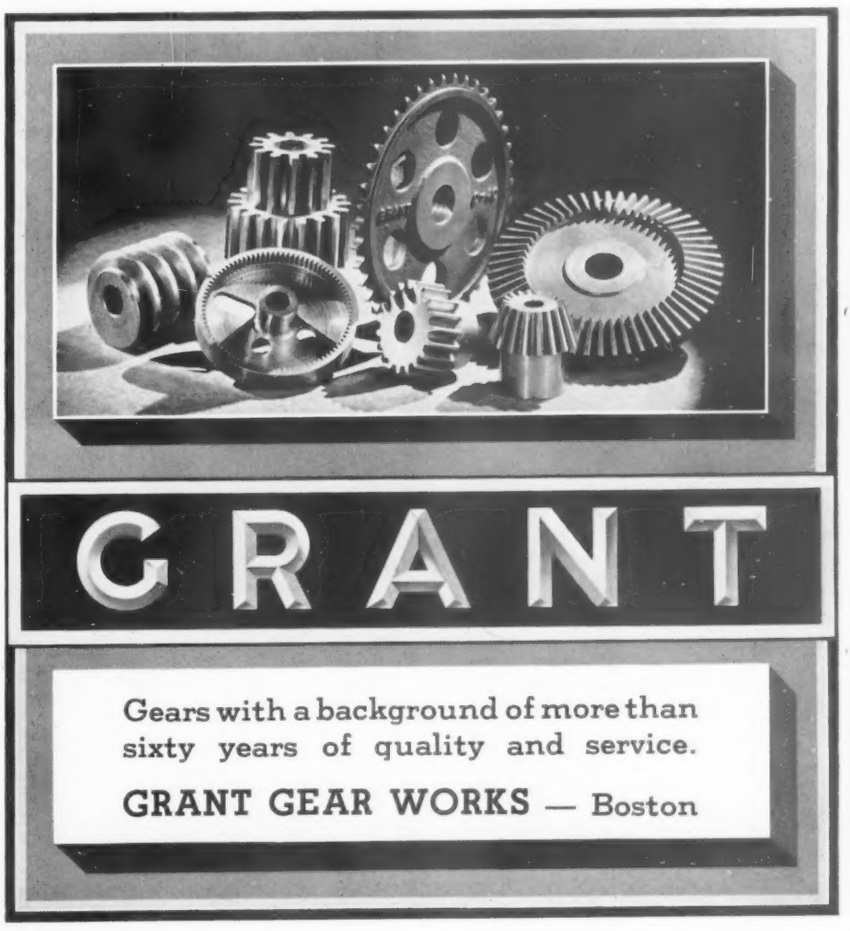
1800 tons, two bridges for the city of Youngstown, O.; bids expected in November.

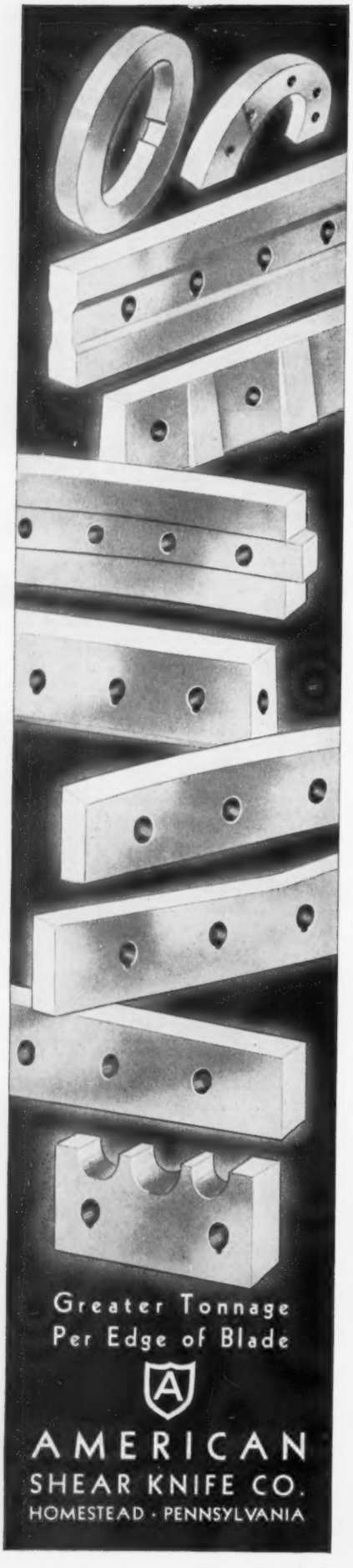
1100 tons, machine and structural assembly shop, navy yard, Philadelphia; bids Oct. 6.

725 tons, Calvin Coolidge high school, Washington; bids exceeded estimates, but may be accepted provided alternates are approved, also included 750 tons of bars.

719 tons, Spec. 154-PWA, smith and pipe shops; bids to supply officer Puget Sound Navy Yard, Wash., Sept. 20.

600 tons, new plant, Spencer Lens Co.,





Cheektowaga, N. Y., bids Sept. 20.

600 tons, crane runway extensions, navy yard, Brooklyn; bids Sept. 28.

500 tons, piling, bulkhead, Eighty-second street south to Bowery Bay, Queens, N. Y.; J. Rich Steers Inc., New York, low.

500 tons, warehouse for navy yard, Philadelphia; bids Sept. 19.

428 tons, grade separation ramps, Linden street, Queens, N. Y.; Duffy Construction Corp., New York, low.

400 tons, additions, machine and electrical shop, navy yard, Portsmouth, N. H.

325 tons, high school, Wyomissing, Pa.; E. A. Reider, Reading, Pa., low on general contract.

310 tons, bridge, project RC-3986, Waverly-Lockwood, Tioga county, New York; Lane Construction Corp., Meriden, Conn., general contractor at $176,298.50, bids Sept. 7, Albany.

300 tons, bridge, Brookhaven, N. Y., for Suffolk county, New York.

300 tons, addition to Horace Greeley school, Chappaqua, N. Y., for board of education.

292 tons, three warehouse, McChord field, Fort Lewis, Wash.; Allen & Early, Tacoma, Wash., low on general contract.

260 tons, state bridge 5804, Little Fork, Minn.

235 tons, Concord school, Pittsburgh, for board of education.

230 tons, telephone building, Seventy-first street, New York.

200 tons, post office annex, Providence, R. I.; bids Oct. 7.

200 tons, fish hatchery, Leavenworth, Wash.; bids opened at Denver by bureau of reclamation, Sept. 15.

200 tons, high school, Coatesville, Pa.; bids postponed to Oct. 4.

200 tons, Sutter county home, Bellefonte, Pa.; bids Sept. 19.

180 tons, addition to Webb sanitarium, Bronx; plans revised.

180 tons, state highway bridge, York, Nebr.; closing Sept. 22.

160 tons, highway construction, Duluth, Minn.; closing Sept. 30.

130 tons, beam spans, Paxico, Kans., for Chicago, Rock Island & Pacific railroad.

125 tons, laboratory department of Parks, Brooklyn; Thomas Sperling Co., New York, low.

125 tons, gates and trash racks, Heart mountain, Wyo., project; bids in at Denver, Sept. 7.

125 tons, state power house, Newberry, Mich.

125 tons, garage, Lexington, Ky., for C. T. Crowe.

125 tons, reconstruction of bridge R-94, Rochester, Minn., for Chicago Great Western railroad.

110 tons, bridge RC-2542, barge canal lock 9 connection, repairs, Schenectady county, New York; Howes & Farrell Inc., Carthage, N. Y., general contractor.

100 tons, sheet piling, bulkhead for custom house, Ketchikan, Alaska; general contract to J. B. Warrack Co., Seattle, Wash.

100 tons, state bridge, Rollinsford, N. H.; bids in.

100 tons, garage, Fort Devens, Mass.; bids in.

100 tons, state bridge, Jackson Hollow, N. Y.; J. F. Morgan Co., Whitney Point, N. Y., general contractor.

100 tons, addition, Lockport City hospital, Lockport, N. Y., Gambin Construction Co. Inc., Buffalo, low.

100 tons, fish traps and appurtenances, Rock Island, Wash.; bureau of reclamation project; Kern & Kibbe, Portland, low.

Unstated, 536-foot steel and timber state bridge; bids at Boise, Ida., Sept. 23.

Reinforcing

Reinforcing Bar Prices, Page 147

New York — Sharp increase in reinforcing steel buying is featured by a 5000-ton contract for a Brooklyn housing project. An elevated highway, Queens, 792 tons, has also been placed, and awards in the metropolitan district approximate 7500 tons. New inquiry is less active, and prices are still soft. Highway mesh is more active in Connecticut, estimates being in on close to 500 tons, while less tonnage is pending for New York state.

Pittsburgh — Concrete bar inquiries are appearing in fair volume, but new projects are small. Several large jobs are expected to come up for bids shortly, however, these being government work now in the engineering stages. Inquiries are topped by 475 tons for a Traverse City, Mich., hospital. Prices are steadier, especially on larger tonnages.

Cleveland — Reinforcing bar orders are limited to lots of less than 50 tons. A number of state schools are up for bids shortly, requiring a substantial tonnage of joists. Private work is at a minimum and little improvement is anticipated. Early placing is expected of 1500 tons of bars for the west approach to the Main street bridge, Cleveland.

Chicago—While total business in reinforcing bars shows little change, large inquiries and awards are less numerous. Majority of new work takes an average of 25 to 30 tons, but such jobs are increasing.

Boston — With reinforcing bar buying confined mostly to small lots, an increase in new inquiry and pending tonnage already figured indicates a material improvement in bookings the next ten days. Close to 3500 tons is active, including barracks, Fort Devens, Mass., hospitals, schools and a post office annex, Providence, R. I., closing Oct. 7 and taking 500 tons. Prices continue to

Concrete Bars Compared

	Tons
Week ended Sept. 17	**12,823**
Week ended Sept. 10	**17,114**
Week ended Sept. 3	**10,945**
This week, 1937	**7,278**
Weekly average, year, 1937	**6,061**
Weekly average, 1938	**6,449**
Weekly average, August	**9,892**
Total to date, 1937	**243,065**
Total to date, 1938	**245,063***

*** Revised**

Includes awards of 100 tons or more.

sag, notably on the more attractive purchases.

Philadelphia—American Steel Engineering Co., Philadelphia, has booked 125 tons of bars for the Yeadon high school, Philadelphia; through M & L Construction Co., Philadelphia. Highway and grade elimination work is requiring some tonnage but total volume is disappointing to fabricators. Prices are none too strong.

Buffalo — Activity in reinforcing steel this month will reach a new peak since last October. The 1200 ton Lakeview housing project here is the largest single tonnage up for bids in months. The 200-ton award for the U. S. barracks at Bath, N. Y. went to the Bethlehem Steel Co.

San Francisco — Concrete bar awards are lighter, totaling 1234 tons and bringing the year's total to 95,631 tons, compared with 73,574 tons in the 1937 period. City of Los Angeles has placed two lots, 350 and 110 tons. Other awards include 210 tons for two cottages at the Sonoma state home, Eldridge, Calif., and 118 tons for Washington state highway work.

Seattle — Small tonnages predominate, mostly for public works projects, schools, municipal buildings, etc. However, rolling mills are more active than in six months. Several important projects involving sizable tonnages of concrete bars will be up for figures soon, among them a large barracks at Fort Lewis, Wash.

Reinforcing Steel Awards

5000 tons, superstructure, Red Hook housing project, Brooklyn, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; George A. Fuller Co., New York, general contractor.

3000 tons, Grand Coulee dam, Odair, Wash;. to Bethlehem Steel Co,. Bethlehem, Pa.; through Consolidated Builders Inc., Oakland, Calif.

792 tons, elevated highway and approaches, 45th to 64th street, Queens, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; Elmhurst Contracting Co., New York, general contractor.

580 tons, underground magazines, United States government, Savanna, Ill., to Bethlehem Steel Corp., Bethlehem, Pa., through Universal Highway Products, Chicago; Mid-West Construction Co., contractors.

546 tons, sewer Cropsey avenue, Brooklyn, to Igoe Bros., Newark, N. J.; P. Tomasetti Contracting Co., Brooklyn, general contractor.

400 tons, North avenue bridge, to Inland Steel Co., by state procurement office, WPA.

350 tons, purchasing agent, Los Angeles, specification 7900, to unnamed interest.

250 tons, group 15A, Central Nebraska Power & Irrigation works, Hastings, Nebr., to Colorado Fuel & Iron Co., Denver, Colo.; Western Asphalt Construction Co., contractor.

210 tons, two cottages, Sonoma state home, Eldridge, Calif., to Gunn, Carle & Co., San Francisco.

200 tons, barracks, Fort Dupont, Del., to Taylor-Davis, Inc., Philadelphia; J. A. Bader & Co., Wilmington, Del., contractor.

200 tons, buildings, federal prison, Dallas, Tex., to Southern States Steel Corp., Dallas; Dolph-Bateson Construction Co., Dallas, general contractor. Weaver Inc., Dallas, awarded contract for lintels.

167 tons, foundations, Triborough hospital, Queens, N. Y., to Carroll-Mc Creary Co., Inc., Brooklyn, Moccia Construction Co., Brooklyn, general contractor.

163 tons, including 23 tons, shapes, overpass over St. Louis & Santa Fe railroad, Yarbo county, Arkansas, to Arkansas Foundry Co., Little Rock, Ark.; Fred Luttjohann, Little Rock, general contractor.

150 tons, procurement division, treasury department, New York, to W. Ames & Co., Jersey City, N. J.

150 tons, Indian irrigation service, Lady Grass, Mont., to Youngstown Sheet & Tube Co., Youngstown, O., through Hustad Co., Minneapolis.

130 tons, barracks, Ft. Brady, Mich., to Truscon Steel Co., Youngstown.

125 tons, Yeadon high school, Philadelphia, to American Steel Engineering Co., Philadelphia.

110 tons, purchasing agent, specification 3784, Los Angeles, to unnamed interest.

100 tons, building, Sears, Roebuck & Co., Wichita, Kans., to Sheffield Steel Corp., Kansas City, Mo.; Hahner & Foreman, contractors.

100 tons, four reservoirs, Montecito, Calif., to unnamed interest.

100 tons, North avenue pier and jetties, to Carnegie-Illinois Steel Corp., Chicago, by Fitzsimons & Connell Dredge & Dock Co., Chicago general contractors.

Reinforcing Steel Pending

5000 tons, superstructure, Queensbridge housing project, New York; bids in early Oct.

780 tons, state highway projects, Merritt parkway, Connecticut, four contracts, low bidders: D. Deering Co., Inc., Norwalk, Conn.; Osborn-Barnes Co., Danbury, Conn., and A. I. Savin Construction Co., East Hartford, Conn.

475 tons, tuberculosis hospital, Traverse City, Mich.

350 tons, three warehouses, Fort Lewis, Wash., Allen & Early, Tacoma, general contractors.

350 tons, barracks, Ft. Sheridan, Ill.

200 tons, sewage plant, Crawfordsville, Ind.

200 tons, Northeast Catholic high school, Philadelphia; bids Sept. 24.

175 tons, bridge, Melcher, Iowa, Chicago, Rock Island & Pacific railroad.

130 tons, Washington state highway work; bids in.

110 tons, mesh, state highway project RC3985, Rensselaer county, New York; Sheehan Contracting Co., Albany, general contractor.

100 tons, bridge, Purdy, Iowa, Chicago, Rock Island & Pacific railroad.

100 tons, armory, Olympia, Wash.; A. F. Mowat, Seattle, general contract.

Unstated, 600-foot concrete span, Yakima, Wash.; bids in.

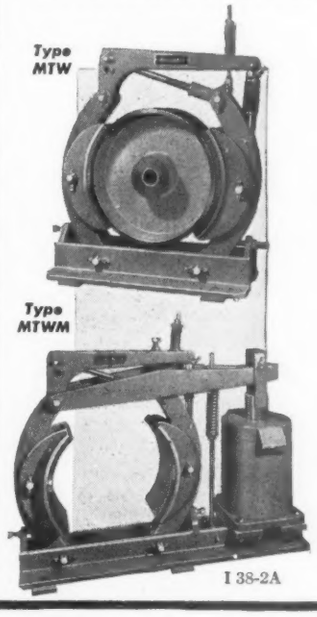
Unstated tonnage, three bridges, Milwaukee; city council approved as PWA projects. Estimated total cost $1,860.-000.

Mail this Coupon NOW!

for information on..

WAGNER

HYDRAULIC ACTUATED INDUSTRIAL BRAKES



I 38-2A

Wagner Electric Corporation
Industrial Brake Equipment
4900 Baum Blvd. Pittsburgh, Pa.

GENTLEMEN: We are interested in Wagner Hydraulic Actuated Industrial Brakes for application as checked below:

☐ CRANES ☐ COKE PUSHERS ☐ TRANSFER CARS

OTHER APPLICATIONS.....

Name.....

Company.....

Address.....

City..... State.....

In all types of industrial applications, Wagner Hydraulic Actuated Industrial Brakes are fast winning favor because of their sure, positive braking action, smooth stopping and controllable deceleration. They have a safety factor that is much more positive than ordinary manual operated brakes . . . no lost energy, and require very little adjustment.

Ruggedness characterizes every construction detail of Wagner Hydraulic Actuated Industrial Brakes—Welded Steel Parts . . . Hardened Pins and Bushings . . . and Cannonite Brake Wheels, are just a few of their outstanding features.

Type MTW is for ordinary bridge service. Type MTWM is equipped with spring-set shunt solenoid release to provide locking device where desired.

If you are interested in low brake maintenance of Cranes, Coke Pushers, Transfer Cars and similar applications—Mail the coupon above and complete information will be sent by return mail.

WagnerElectric Corporation
INDUSTRIAL BRAKE EQUIPMENT
4900 Baum Blvd. · · · Pittsburgh, Pa.

AT THE HEART

. . . and in the heart . . .

OF CLEVELAND

A red-cap is the only taxi you need when you come to Cleveland—because Hotel Cleveland adjoins the Union Terminal. And here you're at the heart of the city — next door to everything you want to see.

But convenience is only one of many reasons you'll like Hotel Cleveland. Food we believe unequalled in hotels . . . more like a transatlantic liner . . . served in four colorful restaurants. Friendliness you'll be quick to sense . . . a *genuine* interest in seeing that you enjoy every moment in our hotel and city. A room as crisp and thoughtfully arranged as your own at home. Public rooms to match your mood —home-like quiet, restful concert music, or gay dancing.

Small wonder that Clevelanders prefer the Cleveland, and experienced travelers warmly agree with them.

HOTEL CLEVELAND *Cleveland*

Pig Iron

Pig Iron Prices, Page 148

Pittsburgh—While pig iron deliveries show little change since a week ago, the movement is heavier than in August. Production is unchanged, with 14 of the district's 50 stacks in blast. Rumors of higher prices for next quarter have ceased as merchant iron sellers are accepting business for fourth quarter at current quotations.

Cleveland—Pig iron releases lately have been below earlier estimates but are heavier than a month ago, and a gain of about 10 per cent is looked for during September. Consumption by jobbing and automotive foundries continues to expand, and releases from farm equipment builders have eased slightly and demand from railroad parts foundries remains at a minimum. Pig iron sellers are taking fourth quarter business at current prices, though some predictions are heard of higher quotations soon, because of high production costs. Lighting of its third blast furnace by Republic Steel Corp. gives this district seven active stacks out of 13.

Chicago — Pig iron movement so far this month compares favorably with August, with an increase in shipments regarded not unlikely the next few weeks. Production of automotive castings to a large extent is responsible for recent gains in foundry operations.

Boston — Scattered small-lot buying constitutes pig iron demand, few orders appearing for more than one car at a time. Although foundry melt has gained in spots, the improvement has not been sufficient to stimulate new purchases to any extent. The district cast pipe foundry continues to be the largest and steadiest consumer. Shipments continue to top new business. While little buying has appeared for fourth quarter, sellers here report they would take tonnage for that period at current prices.

Philadelphia — While shipments are heavier than a month ago, new business is light as consumers are convinced no price advance is in immediate prospect. Foundry operations are slightly better, some plants now running five days weekly against two to three days recently.

Buffalo—Pig iron shipments are improving gradually, best demand coming from midstate foundries engaged in production of heavy machinery. Heating equipment makers show best operations locally. Consumption is increasing, with foundries averaging three to four days weekly. Producers have reaffirmed present prices for next quarter. Pig iron production in this district is up to 35 per cent of capacity, following lighting of the fourth blast furnace by Bethlehem Steel Co. at its Lackawanna plant.

Cincinnati—Opening of fourth quarter books at unchanged prices by Hamilton Coke & Iron Co. and similar action by southern furnaces have had little effect on pig iron demand. Considerable tonnage bought in July, when prices were reduced, will be rewritten for fourth quarter. Some foundries already are covered through the remainder of the year. Deliveries show little change, with casting demand up only slightly.

St. Louis — With unchanged prices in prospect for next quarter and consumers fairly well covered, if not protected by stocks, recent pig iron buying has been confined to small lots for prompt shipment. Consumption has expanded further, with the betterment widely distributed, and iron shipments in September are heavier than a month ago.

Toronto, Ont.—Sales are increasing, bookings the past week rising to about 1800 tons. Melters are taking iron as demand dictates, with sales ranging from a car to 200 tons. Producers will open fourth quarter books shortly and a gain in orders over this period's volume is expected. The daily melt holds around 60 per cent, with indications of an increase soon. Speeding up of armament contracts is counted on to stimulate pig iron production and sales.

Scrap

Scrap Prices, Page 150

Pittsburgh — Scrap is slightly stronger here, with railroad offerings bringing better prices. No. 1 heavy melting steel has been sold into consumption at $15.50, and while some sales also have been made at $15, most tonnage has moved at the higher figure, either as a result of consumer buying or sales to dealers for specific purchasers. Borings and turnings are higher on recent sales to blast furnaces, but quotations otherwise are fairly steady. Export interests again are active here, with some local brokers approached for possible participation in filling a recent order for 80,000 tons.

Cleveland — So little action appears in the iron and steel scrap markets that it appears almost lifeless. Occasionally a car or two is shipped to outside points, but locally neither mills nor foundries show interest.

Chicago — Iron and steel scrap quotations are unchanged, with the

future price trend uncertain. No. 1 heavy melting steel continues $13.50 to $14, the last mill sale having been made at the latter figure more than a week ago. Brokers are paying $13.50 or less for this grade.

Boston—Boat loading is more active and heavy melting steel for dock delivery, export, is stronger with more tonnage bringing $13 for No. 1 and $12 for No. 2. Lower bids are not attracting much tonnage. For Pennsylvania shipment prices are unchanged with buying and shipments light.

Philadelphia — Brokers are offering $13.25 for No. 1 heavy melting steel and $12.25 for No. 2, f.a.s., Richmond, against the 80,000-ton export order recently placed by Italy with four brokers on the basis of $15 for No. 1 and $13.50 for No. 2. Reports have been confirmed that Germany has placed 50,000 tons at approximately the same prices. Export business has bolstered the domestic market which probably would have weakened otherwise because of the slack mill demand. Supplies still are none too plentiful, however. Brokers are paying $13.50 for No. 1 and $12.50 for No. 2 steel against domestic orders, with no new commitments reported. Heavy breakable cast is relatively stronger than other grades.

Buffalo — The scrap market continues deadlocked as buyers refuse to pay prevailing prices and dealers are equally reluctant to accept lower bids. Leading consumers are out of the market except at figures well below those asked by dealers.

Detroit—Buying is slow and prices of several grades are down 25 to 75 cents. Some dealers are pessimistic, partly because earlier anticipations for business this fall had been set too high. However, the market is vastly improved from its position of six months ago and while little scrap currently is moving to consumers, the outlook generally continues favorable.

Cincinnati—Dealers' quotations on iron and steel scrap are off 25 cents here. Consumer buying is dull and there is little activity among dealers except in purchasing of No. 1 heavy melting steel. A more cautious attitude is noted among dealers, pending foreign developments. Foundry demand for scrap is slow to improve.

St. Louis — Consumer buying of scrap is scant, but dealer coverage of contracts keeps prices steady on most grades, while several items have advanced to new highs for the present recovery.

Toronto, Ont. — Scrap sales and shipments continue to improve. While demand remains spotty, Hamilton mills are taking all offerings of heavy melting steel, and a few sales of turnings have been made. Machinery cast and stove plate are active, some dealers importing cast scrap to fill orders. Several small orders for wrought material are reported.

Warehouse

Warehouse Prices, Page 149

Pittsburgh—Warehouse sales are picking up slowly, but gains are minor and orders largely are for early needs. Little stocking by consumers is noted. Prices of most products are strong despite quiet business.

Cleveland—Warehouse shipments are below expectations. Orders have fallen off in number and total tonnage. This is considered only temporary by some, who predict September business will show an increase of 5 to 10 per cent over August.

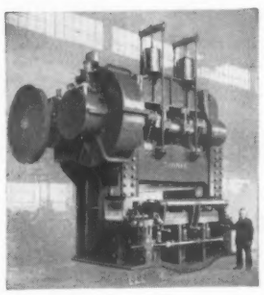
Chicago—Business holds on a par with August volume. While an even trend in September is considered normal, October is expected to mark the peak for the year's sales. Demand is widely distributed. Railroad buying is appearing occasionally, principally for maintenance material and involving only small lots. Extension of warehouse prices into next quarter is indicated by the absence of revisions in mill quotations.

New York — Warehouse volume with most jobbers in the metropolitan area thus far this month is close to 10 per cent ahead of August, with the improved demand well spread as to products. Prices, with the exception of pipe, nails and galvanized sheets, are generally steady.

Philadelphia — Some warehouses report sales the first half of this month as much as 20 per cent behind the corresponding August period. Only part of the decrease is attributed to the holiday interruption. Prices are steadier, although weakness is noted in some products, including plates.

Baltimore — While anticipating fairly good business this fall, iron and steel warehouses report buying so far this month as disappointing. Business is diversified, with prices unchanged.

Cincinnati—New prices on sheets and strip are in effect here, reductions being made to conform to establishment of a Middletown mill

PUNCHES • SHEARS • SPACING TABLES
PRESSES • DIES • METAL-FORMING MACHINERY
BENDING AND STRAIGHTENING MACHINES • MULTIPLE DRILLS
When you think of SHEARS think of THOMAS

Thomas Shears are designed to meet the most exacting shearing requirements. They embody the most advanced improvements . . . features that lower upkeep to a minimum and give the greatest possible production and economy! Feeding tables and gauges can be designed and adapted to your specifications.
Let us quote on your requirements
THOMAS
MACHINE MANUFACTURING COMPANY
Name changed from Thomas Spacing Machine Co.
PITTSBURGH, PA.
FABRICATING MACHINERY

Nonferrous Metal Prices

Spot unless otherwise specified. Cents per pound

Sept.	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin, New York: Spot	Straits Tin, New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
10	10.12½	10.25	9.65	42.60	42.75	4.90	4.75	4.75	20.00	11.25	35.00
12	10.12½	10.25	9.65	42.75	42.90	4.90	4.75	4.75	20.00	11.25	35.00
13	1012½	10.25	9.65	42.70	42.85	4.90	4.75	4.75	20.00	11.25	35.00
14	10.25	10.37½	9.77½	43.00	43.15	4.90	4.75	4.75	20.00	11.25	35.00
15	10.25	10.37½	9.77½	43.40	43.55	5.00	4.85	4.85	20.00	11.25	35.00
16	10.25	10.37½	9.77½	43.45	43.60	5.00	4.85	4.85	20.00	11.25	35.00

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 10.25c Conn. copper

Sheets

Yellow brass (high) 16.75
*Copper, hot rolled 18.37½
*Lead, cut to jobbers 8.25
Zinc, 100 lb. base 9.75

Tubes

High, yellow brass 19.50
*Seamless copper 18.87½

Rods

*High yellow brass 12.62½
*Copper, hot rolled 14.87½

Anodes

*Copper, untrimmed 15.62½

Wire

Yellow brass (high) 17.00

OLD METALS

Nom. Del. buying prices

No. 1 Composition Red Brass

*New York 6.35-6.60
*Cleveland 6.87½-7.12½
Chicago 6.37½-6.62½
*St. Louis 6.00-6.25

Heavy Copper and Wire

*New York, No. 1 ..... 8.00-8.25
Cleveland, No. 1 ..... 7.62½-7.87½
Chicago, No. 1 ..... 7.87½-8.12½
St. Louis 7.50-7.75

Composition Brass Borings

*New York 5.60-5.85

Light Copper

*New York 6.50-6.75
Cleveland 6.12½-6.37½
Chicago 6.37½-6.62½
St. Louis 5.75-6.00

Light Brass

Cleveland 3.62½-3.87½
Chicago 4.25-4.50
St. Louis 4.00-4.25

Lead

New York 4.00-4.25
Cleveland 3.75-4.00
*Chicago 3.87-4.12½
St. Louis 3.50-3.75

Zinc

New York 2.50-2.62½
Cleveland 2.25-2.50
St. Louis 2.50-2.75

Aluminum

Borings, Cleveland 6.25-6.50
Mixed, cast, Cleveland 8.75-9.00
Clips, soft, Cleveland 12.75-13.00
*Mixed cast, St. Louis 8.00-8.25

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads 10.75
Standard No. 12 aluminum 13.75-14.25

TUBE MILL EQUIPMENT OF MODERN DESIGN

Let us know your problems and we will be glad to be of service to you.

42 years experience in building tube mills.

TAYLOR-WILSON MANUFACTURING CO.
MAIN OFFICE and WORKS
500 Thomson Ave.
McKEES ROCKS, PA.

base. New quotations have been without effect on volume, although sales have tended upward since Labor day. Industrial and coal mining orders are more numerous.

Nonferrous Metals

New York—General advances in metal prices here last week were attributed to a steady increase in actual consumption, improvement in the statistical positions of the markets, higher levels abroad, and brighter outlook for autumn business. Consumers hastened to cover their requirements in order to be assured of a supply in event of a European war but this was not considered a primary cause for heavier buying.

Copper—Prices advanced ⅛-cent on Wednesday to the basis of 10.25c, Connecticut. Fabricators raised prices ⅛-cent on copper, phosphor bronze, and nickel silver products but held yellow brass, 80 and 85 per cent red brass products unchanged with the exception of free turning yellow brass rod which was cut ⅛-cent. Bare and magnet wire prices advanced ⅛-cent while weatherproof held unchanged. Export copper closed at 10.45c, c.i.f. World stocks of refined copper dropped 28,672 tons in August to 494,524 tons as apparent consumption increased to 177,580 tons while refined output increased to 148,908.

Lead — Heavy demand for lead lifted prices 10 points Thursday to 4.85c, East St. Louis, and 5.00c, New York. Buying has been heavy each day since the foreign producers formed a cartel.

Tin—Due to uncertainty regarding war risk insurance rates on tin shipments, offerings of futures were scarce and prices mostly nominal. Offerings of nearby metal were limited with prices on spot rising to around 43.45c.

Antimony—No change was noted with buying generally restricted to small lots at 11.25c, New York, for American spot in cases.

Tin Plate

Tin Plate Prices, Page 146

Pittsburgh—Tin plate buyers are marking time as inventories recede, hoping stocks will last until the price situation is cleared. General line can makers have shared slightly in the general business improvement. Tin plate production holds around 30 to 35 per cent. Carnegie-Illinois Steel Corp. has started to produce tin plate at its new Irvin works.

Chicago—Tin plate production is slow, demand having tapered sea-

sonally and because of price uncertainty. Little change in activity is anticipated until the price situation clears.

New York—Tin plate releases lately have been restricted to bare needs, largely the result of price uncertainties. Some orders have been placed for rolling, the intention being to stock the material pending announcement of the fourth quarter market.

Steel in Europe

Foreign Steel Prices, Page 149

London — (*By Cable*) — Steel production in Great Britain in August was 658,900 gross tons, compared with 683,200 tons in July and 987,700 tons in August, 1937. This is the fifth consecutive decline and the lowest month's output since December, 1935, when it was 654,500 tons. Pig iron output in August was 443,000 tons from 81 stacks, compared with 507,800 tons in July from 90 stacks. In August, 1937, it was 712,600 tons. The previous low was 414,400 tons in February, 1934.

Steel and iron imports in August totaled 50,633 tons, compared with 65,022 tons in July. Exports in August were 135,068 tons, in July 135,-109 tons.

The steel industry is marking time and the tense international situation is depressing trade. Volume of inquiries exceeds actual business but sentiment is improving. Consumers are reluctant to place forward contracts until prices for delivery next year are known.

The Continent reports slow improvements. Better release of orders is expected following the cartel decision to maintain prices. The Argentine, Scandinavian and the Netherlands are chief buyers.

Ferroalloys

Ferroalloy Prices, Page 148

New York—Ferromanganese market has been reaffirmed at $92.50, duty paid, Atlantic and gulf ports, for fourth quarter delivery. Quotations on spiegeleisen and other leading ferroalloys also have been reaffirmed in line with previous expectations. Shipments so far this month are ahead of the August rate.

Semifinished

Semifinished Prices, Page 147

Chicago — Movement of semifinished steel is more active, following a general upturn in production of finished products. Inventories of semifinished grades are regarded as relatively small despite recent gains in production.

Washington — Navy department has awarded contracts for gun barrel forgings amounting to $443,-773.08, as follows: Bethlehem Steel Co., $163,629.75; Midvale Co., $161,-794.65; National Forge & Ordnance Co., Irvine, Pa., $118,348.66.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 147

Bolt, nut and rivet business improves slowly. Much of the increase is contributed by the automotive industry and by construction work, principally public projects. Railroad buying, as expected, remains light, with only small lots being ordered. Some improvement in railroad demand for equipment repairs is in sight however.

New prices are out on semifinished hexagon nuts, with the U. S. S. and S. A. E. qualities quoted separately.

While track bolts have been reduced from 4.35c to 4.15c, base, prices on the general line of bolts, nuts and rivets will in all probability be extended for fourth quarter. Most of these products were reduced around the beginning of the current quarter, whereas track bolts at that time were unchanged.

Equipment

Seattle — Reclamation bureau, Denver, has called bids Oct. 17 for three 150,000-horsepower turbines and three oil pressure actuator type governors for Coulee dam powerhouse. Same office will ask tenders shortly for equipment and supplies, totaling $200,000, involved in the Coulee dam WPA clearing project. Bids opened at Denver Sept. 8 show Pelton Water Wheel Co., San Francisco, low for furnishing two turbines, schedule 1, at $106,498; for schedule 2, generators, Westinghouse is low at $193,480; and for schedule 3, governors, Woodward Governor Co., Woodward, Ill., Pelton and S. Morgan Smith, York, Pa., submitted identical bids $19,236. North Coast Electric Co., Seattle, is low for furnishing Puget Sound navy yard a 550-kilovolt-ampere transformer.

Cleveland — Upturn in machine tool and equipment orders is developing more slowly than was anticipated. Inquiries, however, are more active and dealers expect substantial improvement over the August rate to develop later this month. Automotive parts plants in the district are active and are buying in fair volume. Inquiries continue to come from diversified sources. Some district manufacturers still are working on banks of export orders.

Chicago—Sales of machine tools have slowed down following a small pickup recently. Repair part orders previously bolstered sales somewhat but these, too, have tapered, while inquiries are also coming in at a slower rate now. In spite of this, machine tool sellers are optimistic in regard to the remainder of September.

THE BEST KNOWN NAME IN IRON
HANNA
FOR 71 YEARS
. . . foundrymen have recognized Hanna quality as a standard for comparison. Such a reputation is especially significant today, when close adherence to specifications is so important.
NATIONAL STEEL
THE HANNA FURNACE CORPORATION
MERCHANT PIG IRON DIVISION OF NATIONAL STEEL CORPORATION
Buffalo Detroit New York Philadelphia Boston

Construction and Enterprise

Ohio

BELLEFONTAINE, O. — City, J. W. Thatcher, service director, has plans maturing for improvements in its water, light and gas plants costing $154,525. PWA grant of $72,855 has been allotted and owner has balance available. Project will include installation of 1000-horsepower motor, stoker equipment, coal-handling equipment and condenser.

BRYAN, O.—Village, Charles Hester, clerk, is accepting bids until noon, Sept. 28 on construction of intercepting sewers and sewage treatment plant estimated to cost $215,000; Champe, Finkbeiner & Associates, Toledo, O., consulting engineers.

CADIZ, O.—PWA has made allotment to village of $92,250 for construction of sewage system and disposal plant costing $205,000; will vote on bond issue for balance. Consulting engineers, Herbert & Tilton, Cadiz.

EAST PALESTINE, O. — City, Elmer Dishong, service director, will be ready for bids before Oct. 10 on sewage disposal plant costing $45,455; bond issue and PWA grant approved. F. S. Barckhoff, city hall, Salem, O., city engineer.

GAMBIER, O.—Village, H. C. Parker, mayor, will hold special election Sept. 27 on bond issue to finance building of sewage treatment plant to cost $60,000; application for grant filed with PWA. Consultant is Paul Uhlmann, Columbus, O.

GREENVILLE, O.—Darke County Rural Electric Co-operative Inc. will be ready for bids during October on construction of power transmitting lines to cost $200,000.

KENT, O. — City, Charles Horning, service director, has retained R. F. MacDowell, Cleveland, as engineer to investigate and report on projected waterworks system improvements costing $150,000.

MARYSVILLE, O. — Village, George Scheiderer, clerk, will take bids about Sept. 30 on sewage disposal plant improvements, including plant remodeling, installing sludge digester, trickling filters, Venturi meter and sludge drying beds; cost will be $50,000. Consulting engineer, Floyd Browne, Marion, O.

OAK HARBOR, O.—Village, C. S. Teagarden, mayor, is preparing plans for waterworks improvements costing approximately $140,000; PWA grant of $72,900 approved. Consultants are Champe, Finkbeiner & Associates, Toledo, O.

RIPLEY, O.—PWA has approved grant to village, J. N. Stephenson, clerk, on electrical system improvements costing $45,650, plans to be completed for project by Sept. 30. Floyd Browne, Marion, O., engineer.

SHARONVILLE, O.—City, Harry McGrew, mayor, votes Sept. 30 on bond issue of $46,000 for construction of sewage system and either extension of interceptor sewer or erection of disposal plant; if bond issue is approved WPA will grant $80,000. Barstow & Lefeber, Cincinnati, consulting engineers.

WAUSEON, O.—PWA has approved grant to city, Herbert Demaline, mayor, for construction of sewage system and treating plant to cost $89,000, plans of which will be ready soon. Champe, Finkbeiner & Associates, Toledo, O., engineers.

WELLSTON, O.—City, J. L. Steel, mayor, plans a new municipal electric light plant instead of altering old plant, as originally contemplated; plans for $180,000 project ready about Oct. 20. Work calls for plant construction, boilers, turbine generators, changes in distribution system and lines. Municipal bond issue of $100,000 authorized and application for grant filed with PWA. Consulting engineer, F. W. C. Bailey, Columbus, O. (Noted July 11.)

WEST MANSFIELD, O.—Village, H. B. McDonald, mayor, will have plans ready about Oct. 15 for construction of waterworks system, including water softening plant and distribution system, to cost $75,000. PWA grant has been approved and bond issue authorized for project; Floyd Browne, Marion, O., consulting engineer.

YORKVILLE, O.—Village, A. J. Tolbert, mayor, is taking bids to noon, Sept. 24, on water softening plant, wells, meters and repairs to water system, costing $61,277. Consulting engineer, Paul W. Elwell, 5005 Euclid avenue, Cleveland; deposit $20 for plans.

Michigan

CLINTON, MICH. — Village will vote Sept. 30 at special election on bond issue of $80,000 to finance proposed improvement of municipal light and power works.

DETROIT—Detroit Compensating Axle Corp. has been incorporated with capital of $500,000. Charles Ash, 5124 Braden avenue, representative.

GRAND RAPIDS, MICH.—Buhl Sons Co., Detroit hardware concern, is effecting a four-fold increase in capacity by moving its plant and warehouse to a newly-leased four-story building which is being equipped for its use. H. G. Eastwood is company's Grand Rapids manager.

HAMBURG, MICH. — Hamburg Mfg. Co. is completing general construction of its third new factory unit, providing about 6000 square feet floor area.

PONTIAC, MICH.—City, W. P. Edmundson, city manager, is preparing plans for improvements to sewage treatment plant and is seeking PWA assistance; work to include addition to plant, improvement of Imhoff tanks, new activated sludge units and connecting conduit lines. Louis Wrenn is city engineer.

PORT HURON, MICH.—City proposes construction of a sewage disposal plant and has received PWA grant of $447,545 on project.

ZEELAND, MICH.—O. and A. Electric co-operative has been allotted $1,000,000 by REA to build approximately 1000 miles of rural power lines in eight counties; previous grants of $140,000 and $25,000 were made for power lines and generating plant, respectively.

Illinois

CHICAGO—National Paper Co. is taking bids on construction of a three-story warehouse, 40 x 100 feet; W. T. Brown, Chicago, architect.

CHICAGO — Baldwin Brass Works Inc. has been formed with $10,000 capital by L. Danek, R. Watson and M. C. Danek to deal in metal products. Correspondent, Irwin Baskes, 231 South LaSalle street, Chicago.

EVANSVILLE, ILL. — City has approved bond issue for constructing waterworks and distribution system to cost about $95,000; allotment of $42,750 granted by PWA. J. G. Cooney, Belleville, Ill., engineer.

Indiana

HAMMOND, IND. — American Steel Foundry Co., O. E. Mount, assistant secretary-treasurer, is preparing to expand its plant by construction of four or five buildings and installation of equipment; obsolete buildings to be wrecked. Estimated cost of steel to be used is $60,000.

LA PORTE, IND.—Allis-Chalmers Mfg. Co., Harry Merritt, vice president, will expend $240,000 for construction of one-story plant for production of its new small combine; additional $560,000 will be spent for tools and equipment. Completion is scheduled for Dec. 1.

Massachusetts

RANDOLPH, MASS.—Town is drawing plans for sewerage system to cost $550,-

ACCURACY

Kidd's Micrometer Agrees with Yours

Specializing for 39 years in the production of *drill rods* and cold drawn steels enables us to provide you with the best of material—accurately drawn and heat treated—carefully inspected and smoothly finished.

An "efficiency" product.

—Also regular and special shapes for all purposes.

Send for the chart of decimal equivalents. It's yours for the asking.

KIDD DRAWN STEEL CO.

Aliquippa, Pa.

(Pittsburgh District) *Phone: Aliquippa, 196*

SCREENS of Perforated Metal

The Harrington & King PERFORATING Co.

5634 Fillmore St., Chicago, Ill.
New York Office—114 Liberty St.

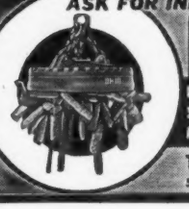
Quality Gears

Treated Gears—Cut Gears—Finished to your absolute specifications.
Light Gears or Heavy Gears. Prompt Delivery.

Also:
Ramsey Silent Chain Drives—Gates Vulco Rope Drives — All Steel Silent Pinions — Bakelite Silent Pinions

THE SIMONDS GEAR & MFG. CO.
25th Street, Pittsburgh, Pa.

ASK FOR INFORMATION AND QUOTATIONS ON



OHIO

LIFTING MAGNETS—Improved Design—Greater Lifting Capacity
SEPARATION MAGNETS—Stronger Pulling Capacity
MAGNET CONTROLLERS—With Automatic Quick Drop

THE OHIO ELECTRIC MFG. CO.
5906 MAURICE AVE. CLEVELAND, OHIO

Boilers • Engines • Pumps
Turbines • Unit Heaters

MURRAY IRON WORKS COMPANY
69th Year of Continuous Operation
BURLINGTON, IOWA

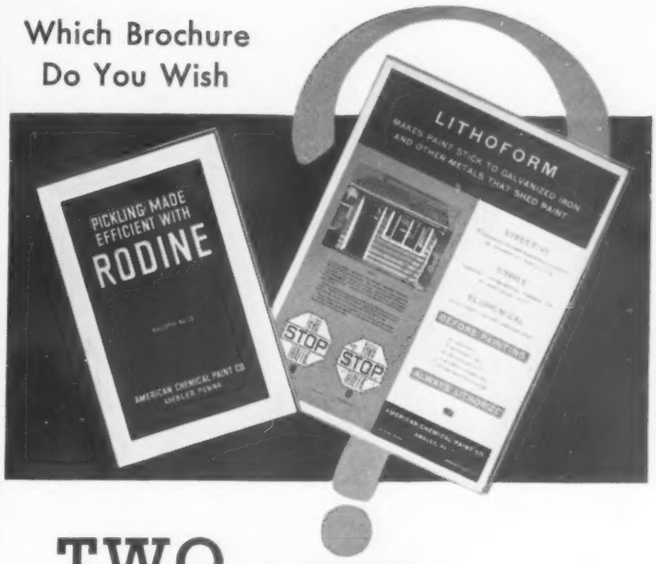
They detach with perfect edges.

We will gladly quote you on any quantity of genuine engraved business cards, and send you samples of what other firms are using. No charge, of course.

DON'T you feel the salesman who presents a crisp, well-arranged *genuine engraved* business card from a Wiggins Compact Binder is selling a better product, which is worth a higher price?

The John B. WIGGINS *Company*
1153 Fullerton Avenue, Chicago
Engravers Since 1857

Which Brochure Do You Wish



TWO CHEMICALS ACP PROCESSES PRODUCTS

That Made Metal-Working History!

RODINE

Revolutionized Pickling of Steel. Is used wherever steel is produced throughout the civilized world.

Is standard in over 90% of the steel mills of America.

Eliminates pitting — prevents overpickling — minimizes the chance of rusting of the pickled product.

Is simple to use, easily controlled, and gives consistent results.

Pays for itself out of its savings.

LITHOFORM

Makes Paint Stick Permanently, to Galvanneal, Galvanized Iron, Zinc-Plated Steel, Cadmium-Plated Steel and Zinc-Base Die Castings.

Lithoform chemically reacts and forms a stone-like surface coating that does not corrode or chip off. Nor is it affected by baking temperatures. Therefore:—

It keeps galvanized surfaces in first-class condition by holding the paint permanently.

Write for either or both of the booklets pictured above.

AMERICAN CHEMICAL PAINT CO.
Main Office and Works
Ambler, Pa.
Detroit, 6339 Palmer Ave., E. Canadian Branch, Walkerville, Ont.

000; Hayden, Harden & Buchanan, Boston, engineers.

Rhode Island

EAST PROVIDENCE,R. I.—Town plans construction of sewage disposal plant, three main pumping stations and seven small unit stations to cost $1,895,000; L. E. Smith, town hall.

New Jersey

JERSEY CITY, N. J.—American Steel Castings Co. has incorporated with 10,000 shares no par stock; agent, the Corporation Trust Co., Jersey City.

Vermont

RUTLAND, VT.—City, E. Tracy, city engineer, is making plans for a $400,000 sewage disposal plant—application for assistance in project filed with PWA. H. W. Taylor, New York, consulting engineer.

OUR AIM is to render service. A little more complete . . . more hospitable...more pleasing . . . than even the most exacting guest expects.

CHAS. H. LOTT
Manager

Every Room Outside with Private Bath
Single from $2.50
Double from $4.00

DETROIT LELAND HOTEL

CASS AT BAGLEY AVE. GARAGE IN CONNECTION

New York

ORCHARD PARK, N. Y.—Village plans will mature soon for construction of sewage disposal plant and sewage system to cost estimated $268,233. Industrial Planning Corp., Buffalo, consultants.

Alabama

MONTGOMERY, ALA.—Dixie Electric Membership Corp. has received an REA allotment of $337,000 for building rural electric power lines in four counties.

Maryland

HAGERSTOWN, MD.—City proposes improvements in its sewage treatment plant to cost total of $85,000; PWA has allotted $38,250 grant.

District of Columbia

WASHINGTON — Yards and docks, navy department, plans purchase of watertube boilers, stokers, coal burners, draft fans, pumps, heaters, tank, combustion controls, coal-handling equipment, track hopper and piping at naval academy. Specification 8915.

Kentucky

ALEXANDRIA, KY. — City, A. M. Turner, chairman of board of trustees, plans construction of a municipal water plant and has applied to PWA for a grant. Engineer, R. C. Stout, Alexandria.

CORBIN, KY. — PWA has allotted $41,945 grant for construction of addition and improvements to waterworks, including elevated storage tank and reservoir; cost estimated at $93,210.

OWENSBORO, KY.—City, H. C. Smith, mayor, plans construction of waterworks, distribution system, treatment plant and wells costing total of $788,083. Black & Veatch, Kansas City, Mo., engineers.

Florida

JACKSONVILLE, FLA.—United States Gypsum Co., 300 West Adams street, Chicago, plans erection of completely modern plant at site near Trout river, adjacent to dock where company will deliver gypsum rock from its quarries.

Georgia

CAIRO, GA. — City has PWA grant for improvements and extensions of sewerage works, pumping station and treatment plant to cost $60,000; will vote Sept. 28 on bond issue for construction of $55,000 sewage disposal plant.

COLUMBUS, GA.—A. K. Adams Co., 542 Plum street, Atlanta, Ga., has been awarded general contract to construct one-story addition to mill buildings of Swift Mfg. Co.; estimated cost $65,000.

DECATUR, GA. — City is planning $56,000 additions to water and sewerage systems and will vote on bond issue Sept. 21.

Mississippi

BATESVILLE, MISS.—City voters have approved issue of $40,000 bonds to match equal PWA grant for construction of municipal power plant to distribute TVA power.

CLARKSDALE, MISS. — City contemplates expenditure of $180,000 for new equipment, including two high-pressure boilers, at light and water plant, and is seeking PWA grant of $81,000 on work.

Missouri

EL DORADO SPRINGS, MO.—City has received PWA grant of $54,000 for constructing $120,000 electric generating plant, equipment to include two 2000-kilowatt Diesel units.

LIBERTY, MO. — PWA has approved allotment of $148,000 grant to aid construction of Diesel generating plant, street-lighting system and distribution system; cost estimated $330,000.

PLEASANT HILL, MO. — City has PWA grant of $72,000 for municipal electric plant and distribution system to cost about $161,111. Diesel engine will be installed.

ST. LOUIS—Gardenville Sanitary & Roof Water Sewer district plans construction of sewage system costing $78,000 and votes on bond issue Sept. 26. Roland Horton, 426 Marshall, Webster Groves, Mo.

Arkansas

RUSSELLVILLE, ARK. — City votes Oct. 11 on bond issue of $177,000 as city's share of projected $320,000 power plant.

Oklahoma

ERICK, OKLA.—City is allotted grant by PWA for installation of generating plant and distribution system estimated to cost $110,000.

GUTHRIE, OKLA. — City proposes construction of Diesel generating station, street lighting system and distribution system to cost $677,448; PWA has allotted $304,852 grant on project.

OKLAHOMA CITY, OKLA.—City votes Sept. 30 on bond issue to finance reservoir, filter plant, pipe line, mains, pumps and motors to cost $3,923,000; M. A. Cunningham, city engineer.

TULSA, OKLA. — City will vote Sept. 30 on bond issues totaling $1,335,000 for construction of proposed water works, storm sewer, sewage disposal plant, incinerator and sanitary sewers.

Wisconsin

EAU CLAIRE, WIS.—White Machine Works, 750 Wisconsin street, has begun construction of an addition to its foundry which will double present capacity; new equipment will be installed in old plant and in addition. Extension is 48 x 52 x 11 feet and will cost about $5000 for building alone.

MILWAUKEE — Froedtert Grain & Malting Co. is opening a $350,000 expansion program at its main plant here and branch plant in Winona, Minn.; considerable machinery will be purchased. Walter I. Teipel is president.

LA CROSSE, WIS.—Board of education will accept bids shortly on $340,000 addition to vocational and trade school as PWA project; Boyum, Schubert & Sorenson, La Crosse, architects. (Noted June 6).

Minnesota

McINTOSH, MINN. — City, W. H. Heneeny, president, has filed application with PWA for grant in the construction of proposed sewage system and treating plant costing $92,000.

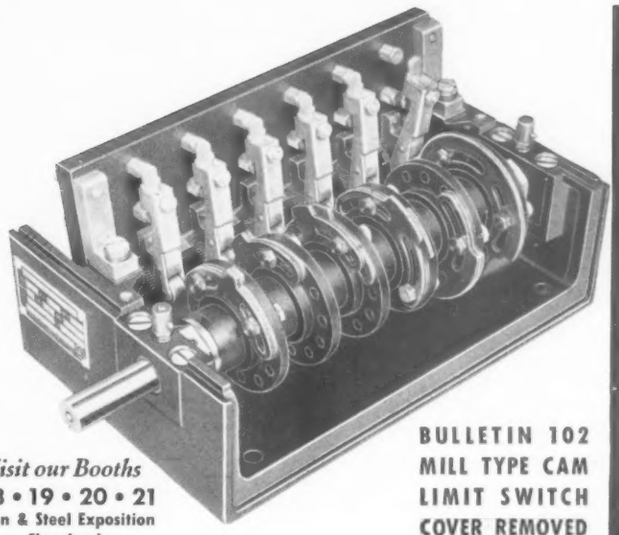
MOOSE LAKE, MINN. — City will be ready to take bids about Oct. 1 for construction of sewage disposal plant, in-

COMPACT— BUT NOT CROWDED!

This Bulletin 102 Heavy Duty, Mill Type Cam Limit Switch while compact, provides plenty of Electrical Clearance.

It's a new addition to the "3C" line of dependable controls and its contact wearing parts are completely interchangeable with similar parts on "3C" Bulletin 101 Mill Master Switches.

Needle roller bearings on the ¾" case hardened steel main shaft are mounted in brass blocks. Remove four screws, and the entire shaft and cam assembly lifts out of the housing without disturbing the fingers on the Slate Mounting. That's compact—but not crowded!



BULLETIN 102
MILL TYPE CAM
LIMIT SWITCH
COVER REMOVED

Visit our Booths
18 • 19 • 20 • 21
Iron & Steel Exposition
Cleveland

Sturdy cast iron, drip-proof housing, double break silver to silver contacts, contact pressure springs retained when movable contact is removed—these—and other features—make this Cam Limit Switch rugged, dependable and full of long time service.

THE CLARK CONTROLLER CO.
1146 EAST 152nd STREET • CLEVELAND, OHIO

AKRON • BALTIMORE • BIRMINGHAM • BOSTON • BUFFALO
CHICAGO • CHATTANOOGA • CINCINNATI • CLEVELAND
DALLAS • DENVER • DETROIT • LOS ANGELES • MINNEAPOLIS
NEW ORLEANS • NEW YORK • PHILADELPHIA • PITTSBURGH
ST. LOUIS • SAN FRANCISCO • SEATTLE • TULSA • TORONTO

LOCOMOTIVE CRANES
CRAWLER CRANES
SHOVELS
OHIO
THE OHIO LOCOMOTIVE CRANE CO.
BUCYRUS OHIO

H. A. BRASSERT & COMPANY
Consulting Engineers for IRON, STEEL, FUEL and HEAVY METALLURGICAL INDUSTRIES . . . . .
310 SOUTH MICHIGAN AVENUE · CHICAGO

JIGS — FIXTURES — SPECIAL MACHINES — PUNCHES—DIES—*"to your measure"!*

Let our trained engineers apply our 32 years' experience to your equipment problem. Our successes in other plants of all types, and proved methods assure a solution of any question involving production machinery. Write us in detail without obligation.

THE COLUMBUS DIE, TOOL AND MACHINE CO.
COLUMBUS, OHIO

BROOKE
PIG IRON
E. & G. BROOKE IRON CO.
BIRDSBORO, PENNA.

MFGRS OF
HIGH GRADE
FOUNDRY
BASIC
GREY FORGE
MALLEABLE
BESSEMER
LOW PHOS.

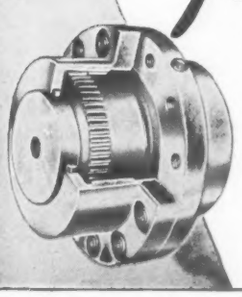
THOMSON

HEADQUARTERS FOR
Manual and Automatic SPOT, SEAM, BUTT, FLASH, PROJECTION, PORTABLE GUN, FABRIC and SPECIAL RESISTANCE WELDING PRODUCTION EQUIPMENT

Write for FLASHES, a monthly magazine of Resistance Welding News and information. Sent free on request by

THOMSON-GIBB ELECTRIC WELDING CO.
General Offices: 163 PLEASANT ST., LYNN, MASS.

WALDRON *Flexible* COUPLINGS



GEAR TYPE . . FRANCKE
"A Type and Size For Every Purpose"

All forged steel; exclusive construction features. Write for descriptive catalog giving sizes, ratings, prices. State type of drive.

Manufactured by
JOHN WALDRON CORP.
New Brunswick, N. J.

cluding treating plant, pumping plant, settling tank, sludge digestor, drying beds and chlorination equipment to cost about $40,000; Charles Handschie, Moose Lake, is engineer. (Noted Aug. 29).

RUSHFORD, MINN. — PWA has authorized an allotment to city, Clarence Reeshus, clerk, in construction of sewage treatment plant to cost $81,818; Ealy Briggs, St. Paul, engineer.

Texas

COLEMAN, TEX.—Coleman County Electric Co-operative Inc. begins work soon on construction of 125 miles rural electric lines; has applied to REA for allotment of additional $200,000 for further extension of 200 miles. W. G. Morrison, Waco, Tex., consulting engineer.

FREDERICKSBURG, TEX.—City votes Sept. 23 on proposed $100,000 revenue bond issue for building of light and power system; current to be purchased from Colorado River authority; will negotiate for purchase of distribution lines from Central Power & Light Co.

GOLDWAITE, TEX. — City, H. G. Bodkin, mayor, plans construction of a generating plant and distribution system and has filed application with PWA for $125,000 grant. W. G. Morrison, Waco, Tex., consulting engineer.

HAMILTON, TEX.—Hamilton Electric Co-operative association has been formed and is applying to REA for $400,000 allotment for constructing 400 miles of rural transmission lines in three counties. W. G. Morrison, Waco, Tex., consultant.

HOUSTON, TEX.—City is making surveys for $1,000,000 water distribution program, work to be partly underway by Sept. 27. PWA has allotted $405,000 grant and city will finance balance by issue of time warrants.

POST, TEX. — City, J. R. Durrett, mayor, plans $100,000 power plant and is seeking loan and grant from PWA; project includes generating plant with 100 and 200-kilowatt electric generators, and distribution system. H. N. Roberts, Lubbock, Tex., engineer.

RANKIN, TEX.—City, T. P. Rankin, mayor, takes bids shortly on waterworks improvements costing $40,000—includes distribution system, wells, pump house, storage tanks and meters. Koch & Fowler, Dallas, Tex., consultants.

WEATHERFORD, TEX. — City, C. F. Russell, mayor, proposes constructing waterworks and distributing system and files application with PWA for loan and grant totaling $414,000. S. M. Field, city engineer.

Kansas

VALLEY FALLS, KANS. — City, F. F. Hurst, mayor, is completing plans for $65,000 improvements of its waterworks, including dam, purification plant, storage basin and elevated tank. Paulette & Wilson, Salina, Kans., consulting engineers. (Noted May 2).

WICHITA, KANS. — City, Bert Wells, city engineer, will vote Sept. 27 on bond issue to finance construction of complete water supply system to cost $2,425,000; Black & Veatch, Kansas City, Mo., engineers.

North Dakota

GRACE CITY, N. DAK. — REA has allotted $30,000 grant to the Tri-County Electric co-operative, C. F. Bohner, president, for installing power plant.

Iowa

AMES, IOWA — PWA has authorized grant to city, J. H. Ames, city manager, for construction of addition to its municipal light and power plant, including generator, cooling tower and crane, to cost $170,212.

ATLANTIC, IOWA — City plans installation of 1500-kilowatt turbo-generator, condenser and switchboard equipment in its powerhouse at cost of $93,900; PWA has approved grant. Young & Stanley Inc., Muscatine, Iowa, engineers. (Noted Aug. 22).

BOONE, IOWA—City will be ready soon to take bids on proposed waterworks extensions costing about $101,000; G. A. Nelson, city engineer.

CEDAR RAPIDS, IOWA — PWA approves grant to city, F. H. Kahn, mayor, for improvement of its sewage plant at cost of $139,312; Howard R. Green Co., Cedar Rapids, engineer.

SIBLEY, IOWA — PWA has allotted grant to city, E. H. Koopman, mayor, for addition to power plant, including 750-kilowatt turbo-generator, to cost $150,909. (Noted July 11).

SIDNEY, IOWA — Village, Britt Stiles, clerk, has filed application with PWA for a grant in the construction of a sanitary sewer and sewage disposal plant to cost $61,365. Buell & Winter Engineering Co., Sioux City, Iowa, consulting engineer.

Colorado

GRAND JUNCTION, COLO.—City rejected first bids and is readvertising on construction of sewage system and disposal plant to cost $185,000. Black & Veatch, Kansas City, Mo., engineers.

Montana

SUNBURST, MONT. — City, D. W. Cunningham, mayor, will take bids about Nov. 1 for construction of sewage system and disposal plant to cost $45,455. Fred Platt, Shelby, Mont., consulting engineer.

Idaho

BONNERS FERRY, IDAHO — Voters have authorized $99,000 bond issue for construction of $289,000 municipal power plant; city is seeking PWA assistance in project.

Arizona

PHOENIX, ARIZ.—City will hold special election Sept. 27 on $760,000 bond issue to finance improvement of municipal water system. J. B. Girand Jr., city engineer.

Pacific Coast

EUGENE, OREG.—City votes Nov. 8 on issue of $80,000 bonds for construction of proposed sewage disposal plant; application filed with PWA for assistance.

PORTLAND, OREG.—PWA has allocated grant of $313,279 on prospective construction of sewage system.

BELLINGHAM WASH.—City is planning water system improvements costing $320,800, and involving replacement of wood pipe with steel and iron, and extension of reservoirs. PWA has approved assistance.

OLYMPIA, WASH.—State highway department will open bids Sept. 27 for construction of service building and shops at Union Gap.

PORT ANGELES, WASH.—City seeks PWA grant on construction of water system extensions to cost $132,700; George Zeb, Port Angeles, engineer.

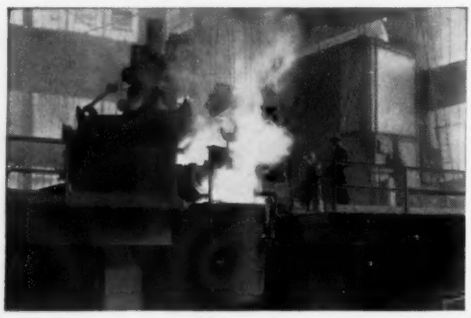
SEATTLE—Butler Packing Co. proposes to build $22,000 food processing plant, 61 x 160 feet; plans by Putnam Engineering Co., Tacoma, Wash.

Canada

BRILLIANT, B. C.—West Kootenay Power & Light Co. Ltd., Trail, B. C., plans power plant to cost $5,000,000. L. Campbell, architect, care of owners.

PRINCE ALBERT, SASK.—Municipality, L. W. Andrews, clerk, takes bids around end of September on waterworks improvements costing total of $75,000. J. Jonson, town engineer.

THE STARTING POINT *of*



FORGINGS

CARBON-ALLOY AND SPECIAL BASIC ELECTRIC STEELS

COMPLETE control of all processing from selection of the melting charge to the finished condition is the N. F. & O. *guarantee of quality* in forgings furnished to your specifications — Smooth Forged, Hollow Bored, Rough or Finish Machined.

Die Blocks and Piston Rods

NATIONAL FORGE AND ORDNANCE CO.

IRVINE, WARREN COUNTY, PENNA., U. S. A.

Comments

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Industry Needs Champion

To the Editor:

The various members of the President's cabinet have the duty to see that the necessary activities of their sections are properly executed.

Several of the more recently created departments are engaged in the management of special activities that pertain only to a part of our people—for instance, those of commerce and labor.

The department of agriculture is an older branch of the same sort. It is quite apparent that Secretary Wallace is interested in agriculture. His efforts are bent towards helping the farmer in spite of the fact that many of his purposes appear to be left-handed enough to have seriously detrimental effects in the long run, and that the farmer is the sufferer.

Similarly, Madame Perkins is working day and night for the welfare of labor. Her efforts appear to be directed mainly toward the good of the labor leaders, and it is apparent that the interests of the employers and the public never enter her mind.

All of these worthies seem to work on the basis of attorneys for their clients. They are always supporting those, wrong or right, whom they represent. They will take advantage of any uncertainty or doubtful situation and assume that it is the part of the opposition to present its own case.

In the department of commerce, which I believe is supposed to represent the employing interests, no such effort is apparent. Mr. Roper finds fault with our methods of manufacturing and distribution. Most of his criticisms are, I believe, unmerited and all of them are concerning matters already sufficiently broadcast by others of the official family. He could well afford to spend his time in pointing out some of the things that industry has accomplished.

As STEEL well said in its Sept. 12 issue, page 32, it is the unjustified, prejudiced and often vicious and ignorant pronouncements from Washington that promote distrust and make permanent recovery a thing of the far-off future.

J. H. HERTNER

President, Hertner Electric Co., Cleveland.

Steel Industry Alert

To the Editor:

A reason for the steady growth in the use of steel is illustrated by the grasping of opportunity by the industry in the establishment of an "ever-normal granary." Storage of corn in good crop years, to be used in poor seasons, means that the best possible method must be used to obviate loss of the stored material. The industry saw the opportunity and is offering corn cribs of steel, (STEEL, Sept. 12, p. 17). As they cost about the same as wooden cribs their adoption should furnish an outlet for much steel and at the same time give better storage conditions.

This alertness on the part of steelmakers has done much toward increasing markets for their product.

Farmers are large users of steel in the aggregate, in fence material, tanks of various sorts, sheet metal for buildings and roofs, cotton ties, implements and motor vehicles. To add another important item in farm equipment makes the agricultural field that much wider.

The industry has not deemed it sufficient to make the best quality steel possible but it also has sought new uses, which enlarge its field and at the same time benefit the users by replacing less durable materials.

FABRICATOR

Kansas City

Giving Sweden Her Due

To the Editor:

Usually, when important producers of iron are mentioned, the list goes no further than the United States, England, France, Germany and Belgium-Luxemburg. As a native of Sweden I believe that country is entitled to more credit for its production of high class iron ore and pig iron.

A recent government report places the 1937 production of iron ore at 9,000,000 metric tons of iron content. In 1929 it was 6,800,000 tons. This is an increase from 8 to 11 per cent of the world's output in this interval. Sweden's production was almost equal to the 11,600,000 tons of iron ore produced by France and was more than double the 4,200,000 tons by England in 1937.

The Swedish government has received a report from a committee appointed some time ago to investigate the possibilities for an additional blast furnace plant. The committee informs the minister of commerce it believes two stacks should be built at Lulea, one for charcoal and one for coke as fuel. Capacity of the former is set at 20,000 metric tons and the latter at 45,000 tons. It is proposed also to add electric furnace capacity for metallurgical purposes.

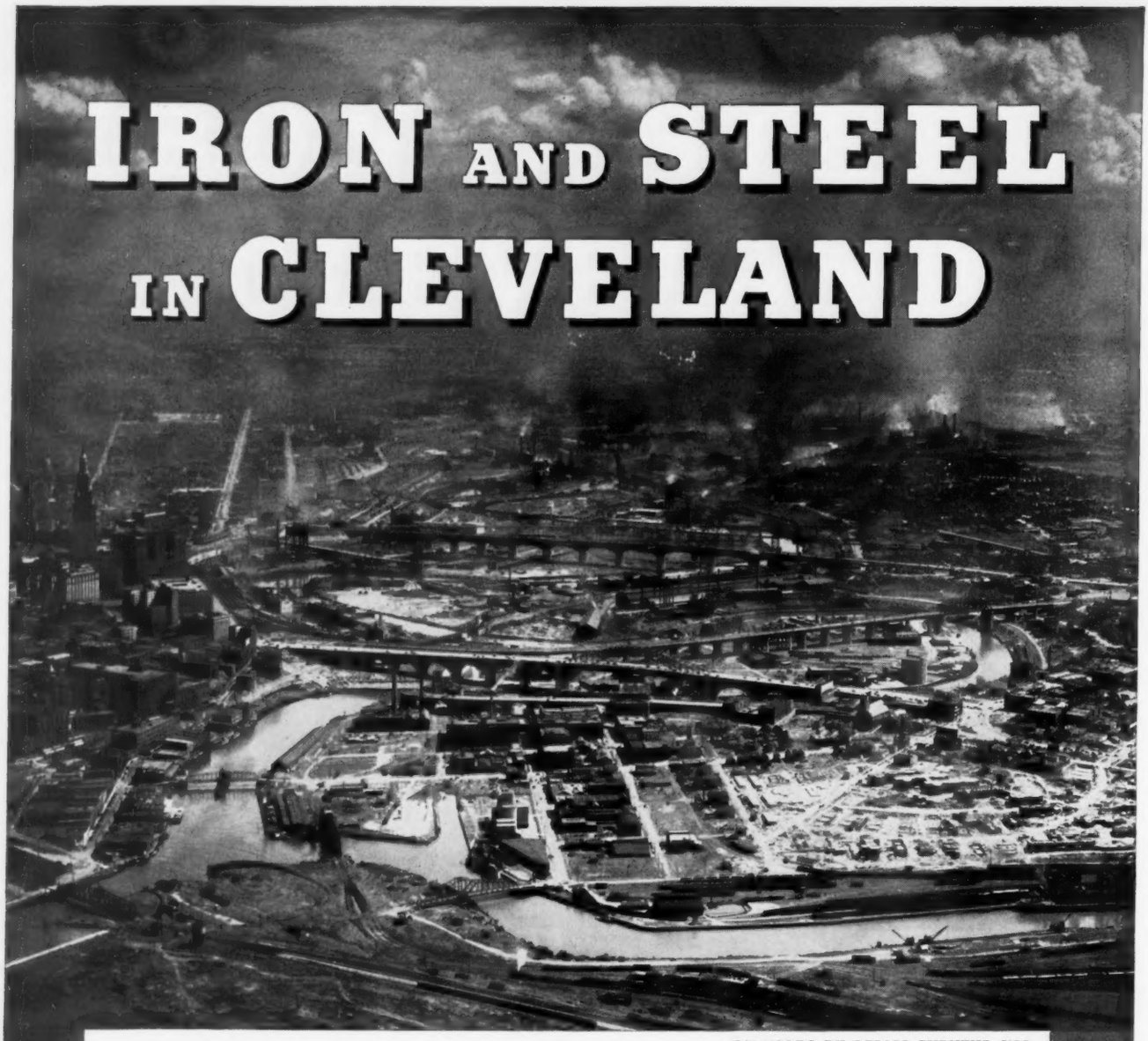
Swedish iron has enjoyed a high place in the world supply, because of its quality, and it is used the world over where especially fine products are desired, and where cost is not an important factor. Thus Sweden is important, not alone for its tonnage position but also because of quality.

I hope you will print this, to give Sweden her due as an important unit in the iron and steel world. I think she will continue to expand her production to hold relative rank with other countries.

CARL JOHNSON

Rockford, Ill.

IRON AND STEEL IN CLEVELAND



AIRPHOTO BY AERIAL SURVEYS, INC.

SURROUNDING the blast furnaces and steel mills of Cleveland are hundreds of foundries and factories producing thousands of articles made of iron and steel. There are many advantages in manufacturing in this great international center of the iron and steel trade. Among these advantages is an adequate, dependable supply of electric power at low cost. The wheels of the iron and steel industry, and allied industries, in Cleveland and northeastern Ohio, turn on power supplied by

THE CLEVELAND ELECTRIC ILLUMINATING COMPANY.